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ABSTRACT

A review of the literature on technology and delivery of service to handicapped students in rural areas, and a sizeable appendix containing abstracts and articles on media and models are presented. Reviewed is literature on using technology: (1) in education, (2) with the handicapped in rural settings using media such as television and computer assisted instruction (CAI), (3) for inservice training, and (4) for special needs including training for uncertified teachers and general staff development. Models for implememting technology are briefly described. Included in appendixes are abstracts on the use of television, abstracts and four articles on the use of CAI, abstracts and two articles on the use of the telephone for instruction, abstracts on the use of packaged programs and instructional modules, a literature review entitled "Technology in Special Education," by A. Blackhurst and A. Hofmeister, and an article entitled "Telecommunications in Rural America: Special Populations, Special Problems," by L. Bransford. A catalog of instructional and professional materials available from the Exceptional Child Center at Utah is also included. (MC)

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Technology Literature Review

Intermountain Plains Regional Resource Center

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Technology Literature Review

Technology and Service Delivery

A Review of the Literature
for Colorado- PAA CO-01-02

Developed by:

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Plains
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TECHNOLOGY AND SERVICE DELIVERY

A Review of the Literature

PAA CO-01-02

Glenn Latham

August, 1981

Colorado Umbrella Transaction #01: Technology and Service Delivery, calls for a five-activity effort addressing the use of technology and technologically based systems to assist schools and school personnel to better serve handicapped youth located in rural areas of the state of Colorado. Following is a review of the literature which identifies (1) technologies that have been shown to be relevant to the instructional needs of the handicapped, (2) the use of technology to train teachers to better serve the handicapped, and (3) systems which seem to be particularly relevant to the needs identified in PAA 01-01: Needs Assessment.

DEFINITION OF EDUCATIONAL TECHNOLOGY

Blackhurst and Hofmeister (see Attachment H) have provided the following which defines "technology" in both its current form and in its historical perspective.

> "To many special educators, "technology" is equated with equipment and hardware such as audio-visual equipment, teaching machines, and computers. As the Commission on Instructional Technology (1970) pointed out in its report to the President and Congress, such a conceptualization is inadequate. While it is true that things such as television, films, projectors, and computers are considered as components, technology is much broader than the use of items of hardware and software. As the Commission reported:

> "'Instructional technology is a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication, and employing a combination of human and non-human resources to bring about more effective instruction'" (p. 19).

"At approximately the same time that the Commission released its findings, Haring (1970) reviewed the application of instructional technology to special education curriculum design and concluded:

> "'In the natural setting, educational technology is being applied in two ways: (1) through automated and non-automated media for display and measurement as part of the task of instruction, and (2) as a set of procedures which systematize instruction'" (p. 25).

"Both the Commission on Instructional Technology and Haring were reflecting distinctions developed earlier by Dale (1967), Banathy (1968), Gagne (1968), Heinich (1968), and Silverman (1968).

"In 1977, after an extensive study, the American Association for Educational Communications and Technology (AECT) adopted and published a comprehensive definition of educational technology (Educational Technology: Definition and Glossary of Terms, 1977). Space limitations preclude the reproduction of this sixteen-part definition; however, the introductory sentence states that:

> "'Educational technology is a complex, integrated process involving people, procedures, ideas, devices, and organizations for analyzing problems and devising, implementing, evaluating, and managing solutions to those problems involved in all aspects of human learning'" (p. 1).

"The AECT report goes to some length to differentiate between educational technology and instructional technology. However, it is common practice to use these terms interchangeably."

In this review, the terms are used synonymously.

INTRODUCTION

Since Sidney Pressy invented his first teaching machine, technologically based instructional programs/devices have proliferated at a remarkably rapid rate. Contained in this review is a representative selection of what is found in the literature relative to educational technologies. An exhaustive account of what is found in the literature would be neither feasible nor appropriate in this instance.

USING TECHNOLOGY IN EDUCATION

It is generally agreed that all educational programs, no matter where they are located, can benefit from the use of technology. But to assure success, no matter what the setting, certain conditions must exist (Harris and Atkinson, 1976; Walker, 1976; Tyler, 1980; Heath and Orlich, 1977; and Locatis and Atkinson, 1976), including:

1. Administrative Support. Implementing a technologically based instructional system cuts across many aspects of an educational program (facilities, budgets, inservice training, schedules, strategies, support service, etc.), and the only member of the system that has such broadly based responsibilities is the administrator. Without that person's support (in fact, enthusiastic support), little can hope to be gained by involving technology in anything more than a very modest basis, e.g., using self-contained instructional packages.
2. Fiscal Support. Of all instructional support systems, few are more costly than are the hardware and software of technology. Such support should be future oriented and ready

to see a project beyond its most costly implementation phase. It is disconcerting to note the amount of hardware sitting idle because there were inadequate funds for program operation once the equipment was in place, or to see the project through an unanticipated costly developmental phase.

As one analyzes the circumstances that have led to the idleness of hardware and software, it is not unusual to note that the initial expenditures were from some type of special grant (usually federal) and were promoted by a well-meaning, ambitious educator (or small group of educators) who wrote a proposal that was funded. Almost in isolation, the project was conceived, grew, borne, and short lived, having died because of inadequate (or no) operational funds (and often inadequate administrative support!).

When establishing a technologically based instructional system, long-range fiscal planning is necessary which includes the costs of

> . . . the actual materials, development time and salaries, capital outlays for equipment and space, field trips and revision, and operational expenses which include consumable items (Heath and Orlich, p. 26).

3. Cost Benefits. There is nothing about the use of technology that assures better educational results. As noted by Ralph Tyler:

> "During the past 60 years, many technological media, devices, and systems have been invented and developed that have appeared to offer major contributions to the effectiveness and/or efficiency

> of educational institutions. Among the most widely known media, devices, and systems are motion pictures, television, videotapes and discs, computer-assisted instruction (CAI), programmed learning, and individualized learning modules or packages. A considerable amount of research has been conducted on several of these media, devices, and systems in seeking to identify the kinds of educational contributions they can make--the results of which have, on the whole, indicated positive effects. Furthermore, in several cases, widespread promotional efforts were made to encourage their adoption in American schools. Yet their utilization is more limited than was anticipated. Most technological media, devices, and systems have found a significant place in only a small percent of the nation's classrooms" (p. 11).

What is being observed in many of the nation's classrooms are shades of alchemy where the cost of change far exceeds the value of the product. It is important, therefore, to first ask the question, "Will using this technology produce the desired results, at a better price, than is presently the case?" Productivity, not processes, is at the heart of the matter.

Thiagarajan (1977) has made this thoughtful observation:

> "In the early days of teaching machines, a powerful one-liner was, 'If any teacher deserves to be replaced by a machine, he ought to be.' I am suggesting that the converse is also true. There are many machines in our instructional system which deserve to be replaced by human beings, and they ought to be if only for purely mercenary considerations" (p. 44).

4. Defensible Motives. Teaching technologies cannot replace teachers--but they can support them. If the motive is to replace the teacher with a device, the project is doomed at the outset. Tyler has observed:

> "When teachers were aroused by the problems of learning faced by minorities and other disadvantaged children, they seized upon innovative devices that

> appeared to solve their problems, but they were soon disappointed because the problems of learning [that] these children encountered involved more factors than any of the devices were designed to attack" (p. 12).

Some teaching <u>functions</u> can be replaced by a technology.

Tyler cites some instances:

> "A typical teacher finds a new technological medium, device, or system attractive when it will perform tasks which are distasteful or boring to him or her. This motive is common to most persons as well as teachers. Automatic dishwashers and laundry machines were quickly adopted because they performed tasks that were distasteful to most people. Teachers quickly adopted workbooks and audiotapes for drill and practice. They also used computers for drill and practice when the school could afford them; drill is commonly viewed as boring.
>
> A typical teacher finds a new technological medium, device, or system attractice when it will perform tasks which he or she recognizes are important but which he or she has not been able to perform effectively or easily. Most teachers feel a responsibility to provide instruction appropriate to the individual differences among their students, but they do not see how they can make such provisions when they must be responsible for a class of 25 to 35 students. They are attracted to multi-level reading labs, because they furnish reading materials appropriate for several different levels of reading development. Overhead projectors provide the flexibility of the chalkboard to outline, to explain, to illustrate, or to direct without requiring the teacher to have his or her back to the class. The motion picture is attractive to the teacher when he or she wishes to present an event or a process more fully and vividly than he or she is able to do with printed or oral presentations" (p. 11-12).

5. <u>Personnel Attitude and Support</u>. Though some teachers have viewed technology as a surrogate teacher, most teachers are offended and even threatened at the thought of being replaced by a computer or a machine. Also, teachers often view technology as an excessively expensive endeavor that takes money

away from other more important instructional needs. Teachers may resist using technology because of " . . . the fear of getting involved in [a] program" (Harris and Atkinson, 1976) that is unfamiliar and even mystified to them. Computers, for example, are very intimidating to some teachers--an attitude that tends to place considerable distance between the teacher and the use of CAI. Also, some students may find it distasteful interacting with a machine.

Before involving the use of technology, therefore, it is important to have the support of those who will be manipulating and managing that technology.

6. Personnel Training. Before technology is employed, those who are to be involved must be trained in its use, and such training should be criterion referenced, i.e., specific knowledge and abilities must be demonstrated by those who are trained. Although a good deal of imagination and creativity, for example, go into the development of "canned" or "packaged" instructional programs, once the programs have been developed and found to be effective, it is generally inappropriate for the user to modify them. Teachers need to realize this and be trained in how to both choose and apply technology to support their teaching.

Inservicing new personnel who are hired after a system is in place is also vital to the successful use of technology. The author recently evaluated a technologically based support system that had been installed in a large, state-wide school

> system. He was interested to observe that in those instances (rural or urban) where new personnel were regularly and systematically inserviced, the system worked well and was highly regarded by the teachers. It was less functional in those settings where fellow teachers took it upon themselves to "acquaint the new teacher with the system," and where no introduction to the system was available, it was stuck away in a closet; and potential benefits were not being realized for either the students or the teachers.

Enumerated here are some of the most basic conditions that must exist if technology is to be used successfully in the educational process. Following are references to technologies that have been shown to be successful in the instruction of students having special needs or technologies that could be easily adapted to meet the special needs of students in rural areas.

USING TECHNOLOGY WITH THE HANDICAPPED

Emphasis on Rural Settings

This section of the review relates the use of technology in the instruction of the handicapped, beginning with several references that address the general use of technology in special education. Subsequently, references will be cited that relate to the use of technology with specific handicapping conditions, and the use of technology in teaching specific skills/academic subjects to the handicapped.

Technology and Special Education--General Use

Television. Though one of the most commonly known technologies for instructional purposes, television is economically feasible in the schools only when made available through public broadcasting channels, and its instructional value is dependent on how well teachers select and schedule programs to meet the needs of students. Recently the author evaluated the statewide educational television programming of a predominantly rural state. The findings revealed (to no one's surprise) that the instructional impact of the programs was frequently diluted because they were selected and used inappropriately. Rather than viewing them for instructional purposes, they were often used to entertain the class, to fill unplanned blocks of time, to cover for teachers when they were out of the room, and simply because they were being aired. However, in those instances where the school or district had available a specialist whose responsibility it was to work with teachers in the selection, scheduling, and integration of educational television offerings, the instructional impact was markedly improved. It was also interesting to observe that when such a person was involved, the television monitoring equipment tended to be in better repair and more functional (to some extent because students were not allowed to indiscriminately operate the equipment).

Although still in the development stages, satellite technology has been used for educational and information purposes in remote regions. Such programming, made available in the past (Satellite Helps Kids in Isolated Regions, 1974, and Dyre, 1974) through grants from HEW and NASA, has been beamed to remote areas of Appalachia, Rocky Mountain states and Alaska. Programming consisted of the broadcasting of specially

prepared videotaped "educational packets." In some instances, supplemental materials were sent to the schools in advance of the programs, and "two-way audio hook-ups" (via satellite) allowed for discussion between the classroom and the television instructor. Use of the satellite also enabled the live presentation of television programming from educational television channels.

Although satellite technology is expensive, when "aggregated" with other public service organizations, it is affordable, as observed by Bransford and Potter (1978). Most individual public service organizations cannot now afford access to the sophisticated information-system presently (or soon to become) available. If cost-effective information networks, which are responsive to individual user requirements, are to become operational, it will be necessary to aggregate sufficient numbers of users to allow effective negotiations for core service requirements (p.3). As noted by Dyre (1974), the initial costs of such an effort are "ultra expensive" but can be "averaged down" over the years by continued and expanded use. Attachment I contains a manuscript that addresses the use of satellite technology to meet the needs of special populations in rural areas.

Although the use of such sophisticated technology has vast potential for beaming educational programming to students in remote regions, the need for teacher direction, interpretation, and evaluation are essential (Dyre, 1974). As noted earlier, the value of television technology, as with the use of other technology, requires the involvement of a knowledgeable teacher.

Project HOPE (Home Oriented Preschool Education) used commercial television broadcasting facilities to provide parents living in Appalachia with instruction in how to prepare their 3-5 year old children for public school. These were children who otherwise would not have access to nursery school programs. Additional support was provided by mobile classrooms for

weekly group instruction. The author notes that "Programs of such magnitude would require federal funds. . . "

Hayes (1977) and Ardi (1977) describe efforts made by Sesame Street to develop educational television programming for "children with retarded development." Results of these efforts on the development of positive self-image of mentally retarded children and their parents, appreciation and understanding by nonretarded children of the abilities and limitation of mentally retarded children, and attending and on-task behaviors of mentally retarded children are available upon request from the producers of Sesame Street. The data indicate that the programs had a positive effect on children (mentally retarded and nonmentally retarded) and parents.

Attachment A contains references to the use of television as an instructional device when working with the handicapped. Copies of the articles are generally available by writing to the source shown in the reference.

Videotapes (VTR). Videotape recordings, because of their flexibility of use, are becoming more and more popular as a medium for training, instruction, and information dissemination, and can be used effectively in individual, small group, or large group settings. Also, if recording equipment are available, VTR's can be produced locally for playback at a later time. Teachers of LD/ED children in a rural community of Southern Illinois used portable videotaping equipment in their classes to improve teacher skills in documenting student behavior. As a result, teachers developed skills in identifying precipitating off-task antisocial

behaviors in their students and also identified the rewards that were most successful in increasing positive interaction among students. The teachers also noted that their skills in relating to the students had improved.

As with other forms of sophisticated media, VTR equipment requires people with expertise in its use. Producing tapes is expensive and would probably not be justified on a single school basis. The Illinois project described above was conducted as a cooperative of fourteen districts and was found to be very cost effective. Certainly in a multi-district/cooperative basis, involving VTR technology would be reasonable--assuming that a proper administrative attitude prevailed, i.e., a progressive, vigorous attitude toward the use of intervention strategies that capitalize on the best available resources and technology. As with the Illinois project, many school systems use VTR to share information within the system and to conduct school business. For example, a videotape recording can be made of a local teacher demonstrating a technique or procedure that has been particularly effective in his/her classroom in dealing with a specific problem or need. The tape could be sent throughout the system for other teachers and administrators to view at their leisure. A Cooperative director of special education could use VTRs to communicate with his/her staff in the field, and central office-based specialists could share information with classroom teachers and aides relative to working with a particular child. Once the information has been shared, the tape can be reused. By using such technology, many travel dollars and hours can be saved and put into more productive activities.

The use of VTR technology does not, however, require production capability. Since many televised instructional offerings are available in cassettes, having only playback equipment can be useful. An important point

to consider here is making sure that the equipment is compatible with the tapes that are available. Videotapes come in several sizes: half inch, three quarter inch, and one inch. Presently, most videotaping is being done on three-quarter-inch tapes for school use and half-inch tapes for in-home use. One-inch tapes are used almost exclusively for studio and commercial broadcasting purposes (Thorkildsen, 1981). The cost of production equipment for one-inch video recordings is about four times as much as for three-quarter-inch recordings.

Attachment B contains references to the use of VTR technology in the education of the handicapped.

Computer Assisted Instruction (CAI). The computer has become the bright new star on educational technology's horizon and occupies more space in the literature of educational technology than any other single topic. Its use in special education has been given considerable attention.

Although the potential of CAI to serve special education in both rural and urban settings is undoubtedly immense, Trow (1977) points out that the computer is appropriate only as another tool to be used by teachers, and not as a means for replacing teachers.

> "Ideally, then, all education becomes special education to the extent that it is adapted to what are known to be the individual learner's interests, abilities, aptitudes and needs. If what is to be taught can be handled ably and economically by computer, all well and good. If the computer performance does not furnish the derived satisfaction with learning and with the goals sought, these goals should be provided for in other ways.
>
> The idea, then, is not to try to figure out how much "education" CAI can deliver, but to provide the education desired, using the best means that can be devised" (p. 20-21).

Presently, the high cost of hardware and instructional programs, and the lack of sufficiently trained personnel at the school/classroom level are major barriers to widespread use of computers as a medium of instruction.

As observed by Trow, "CAI has been tried; it is not a cure-all. Experimental projects nearly always wither on the vine as soon as the special funds are withdrawn" (p. 19). Despite these barriers, the viabilities of the computer as an aid to instruction is increasing steadily, and special educators should be alert to its use with the handicapped learner.

Attachment C contains copies of selected articles, and references to other sources of information, that are included to acquaint the reader with the area of CAI and how it has been applied in educational settings to serve the handicapped.

Telephone. Though not prominantly mentioned in the literature, the use of the telephone for instructional purposes and to support home-school/home-therapist relationships is mentioned.

Of all technologies, the telephone is the most widely dispersed, cost effective, functional, and generally understood medium. Beside the person-to-person communication with which we are most familiar, the telephone has been shown to be a functional tool in support of a variety of educational efforts, many of which are particularly relevant to handicapped students living in rural areas.

Hofmeister and Atkinson (1975) describe The Telepac Project: A Service Delivery Model for the Severely Handicapped in Rural Areas. The project was designed to meet the needs of severely handicapped homebound students. Based at Utah State University's Exceptional Child Center, Parent Involvement Packages (packages, self-contained instructional materials) were sent to parents for use in the home with their children. The telephone (involving the use of a toll free WATS line) was used for

consultation between the parents and the university. The project continues to be highly successful.

Bittle (1975) describes the use of the telephone to make daily contact with parents via a recorded message. In an effort to establish better communication with parents, a teacher of first graders recorded a daily telephone message that parents could dial. The technique was found to be popular in use, and effective in getting instructions of both an academic and nonacademic nature to parents. The impact of the system has improved school performance by the children since parents know what was to be covered in class the next day. Parents also complied with requests of nonacademic nature: "Please have your child bring a spoon to school tomorrow."

While teaching homebound students, the author worked with the telephone company to install telephone hookups between several students and their school classrooms. The systems allowed for two-way communication between between home and class making it possible for the students to both hear the teacher and to ask questions. In every instance, the system worked well and benefited the students involved.

On a more sophisticated plane, Blackhurst (1978) describes the use of the telephone as a part of more complicated telecommunication systems. The first was a two-way system which allowed instructions from the University of Wisconsin to reach 120 communities simultaneously. The second application was a telephone system for computer-assisted instruction (CAI) in which patrons could be linked by phone to the PLATO system. Other more complicated systems involving satellites, closed circuit video networking and television, and radio stations are also mentioned.

Utah State University Extension Service employs the telephone conferencing capability to conduct a monthly, statewide "electronic staff meeting." Extension personnel from throughout the state are gathered together in eight convenient sites at which are located inexpensive conferencing equipment that facilitates open, two-way communication between and among all participants. The author has participated in these staff meetings and attests to their functionality and value.

Attachment D contains additional references about the use of the telephone as an educationally relevant technology.

Packaged Instructional Programs and Teaching/Training Modules. The literature cites a few references which describe the use of packaged, self-contained instructional materials/devices that have been used successfully with the handicapped. The Telepac Project cited earlier (Hofmeister and Atkinson, 1975) used twenty-two (22) packaged programs that were designed to be used by parents while working with their handicapped children at home. Attachment E contains a catalog of those materials. Also contained in Attachment E are ERIC references to Project S.P.I.C.E. and the Multiple Learning Strategies Project which employed packaged programs/modules to teach vocational and career skills.

Packaged instructional programs/modules are attractive in that they are often quite inexpensive, easy/ready to use, and specific to a particular task. As with other technologies, their educational effectiveness depends on their appropriate use by teachers.

Other Media. Cited in the literature is a variety of uses to which other, more common media technology has been put which bears mentioning in this review. Included is the use of audiocassette tapes, audiovisual materials, sight saving devices for the visually impaired, visual tracking devices for children with perceptual impairments, sound amplification devices, and others. Attachment F contains references to this array of items.

One particularly innovative use of audiocassettes is described by Tamblyn (1971). Educators and parents in a rural community of Colorado were concerned about the large amount of student time wasted on the bus going to and from school. To capitalize on this time, a bus was equipped with a seven-channel tape deck with individual headsets for every seat (56 in all). Educational material was played to the students, with tapes being updated regularly. The effectiveness of the program was not noted. To help minimize students' reading problems, Johnson and Discob (1980) noted the use by teachers of audiocassettes to record assignments.

As can be seen by these few references, the unique use of these technologies is found in the creativity and innovativeness of teachers and the reinforcement of their supervisors.

USING TECHNOLOGY FOR INSERVICE TRAINING

Special attention is being given in this review to the use of technology for inservicing teachers since a need for such was expressed during the needs assessment visits and since it is addressed to some extent in the literature.

Technology-based teacher training programs seem to fall into the following categories:

Teaching modules/packages

Films/videotapes/television

Computer-based training systems

Teaching Modules/Packages. Russell (1975) in a provocatively entitled article, "The Way You Always Wanted to Teach--But Were Afraid to Try," suggests the use of student-centered "modular instruction" as a way to individualize instruction and to make training available in a way that might not otherwise be available. He describes a module as " . . . a short unit of instruction dealing with a single conceptual unit of subject matter" which enables " . . . each student to select and monitor one unit of content before moving to another. The modules can be used individually or combined in a multiplicity of different sequences." Though the article describes a training program used at Purdue University, the author suggests that the approach has other application since the modules are easily transported and do not require the involvement of a professional teacher. Each module contains a list of objectives stated in measurable terms, student projects/assignments/activities, and a criterion-referenced mastery test.

Whereas the use of modules, as described by Russell, is generic, other authors discuss the use of modules and packages* to train teachers in specific skills. The Office of Education (1979) describes "A Transportable Professional Development Model for Mainstreaming Students into Vocational Education." "The module is designed to enable teachers working in an actual school situation with a special needs learner to develop an individualized instruction program based on a diagnostic, prescription teaching method." The Florida Learning Resources System (1977) describes a

*These terms are used synonymously in the review.

similar "packet" intended for use in inservice training of teachers of mentally retarded and other children in the elementary grades on career education. Singleton and Leslie (1981) describe the use of "11 teacher training packages" for teaching social studies to visually impaired students in the regular classroom. Finally, Tuttle and Becker (1981) discuss a multimedia program for training classroom teachers to work with gifted and talented students.

Borg, Langer, and Wilson (1975), Borg (1977), Borg and Ascione (1979), and Borg and Ascione (in press) report the effects of self-contained training modules to improve teacher and pupil performance, and to improve teachers' classroom management skills for mainstreamed students. Each module contains printed materials and a videotape that address the skills to be learned. The modules can be self-administered. The data support the effectiveness of the modules as teacher training devices, and demonstrate dramatically the effectiveness of technology as a medium for delivering training without requiring the physical presence of the trainer.

It is clear from the literature that inservice training of teachers in rural areas could be greatly enriched and facilitated by using instructional modules/packets/programs such as those described here. Many such offerings are already available. Others, addressing particular local needs, could be developed without unreasonable dollar or personnel costs--and once developed, can be used again and again.

Films, Videotapes and Television. As with training modules and packages/programs and films, videotapes and television cover a wide range of topics. Unlike modules, packages and programs; films, videotapes and television do not, as a rule, provide an instructional format that is interactive, i.e., with films, videotapes and television the learner tends to be

more passive--though this need not necessarily be the case, as will be noted. Thiagarajan (1975), for example, describes the making of "protocol films," in which records are made ". . .of real or realistic segments of educationally relevant interactions . . . [that] provide a base of specific behavior examples from which the trainee may induct a conceptual framework and learn to identify, relate, and interpret different types of interactions."

Films have been used heavily for inservice training in the field of behavior modification. Cohen and Brown (1973), for example have produced such a film entitled "The ABCs of Behavioral Education." It depicts a behaviorally based program at a school for students 12-17 years old who have social and academic difficulties.

One could cite references almost endlessly that refer to the use of films for teacher inservice training, and though films are viable components of a more broadly based inservice program, they do not stand alone as an instructional medium.

Videotapes and television are also popular media for teacher training and are cited frequently in the literature. Rich (1974) cites the use of videotapes to train early childhood educators of disadvantaged and handicapped youth living in "isolated areas." A unique aspect of this effort was that the teachers were also trained in making videotapes of their teaching, and the teaching of others, so that self-instruction and peer instruction could continue long after the initial workshops ended. The training, conducted by the JFK Center in Denver, served teachers in the remote areas of Texas, Colorado, Wyoming, Montana, and Alaska, and was found to be cost efficient " . . . if school districts in rural areas . . . pool money for equipment."

Another innovative use of videography for teacher training is described by Gurau (1976) in which a timing device was attached to the

videotape recorder that turned the recorder on and off at predetermined intervals. As noted by the author:

> "I have found that when I use the videotape recorder together with the time lapse device in the classroom, most of the problems connected with self-consciousness and artificiality vanish. People tend to forget a videotape recorder that sits in the corner of the room unattended, going on and off at precisely scheduled intervals" (p. 34).

The author also notes that he is able to economically sample classroom behavior over a period of several days.

> "The equipment is placed in the classroom before the class arrives and is left there until after the class has left. I can obtain video samples of a single day or of a group of days without having a technician or myself in constant attendance."

The author continues by explaining ways by which the technology can be used to improve the quality of instruction in the classroom.

Videotape technology is a viable medium for teacher training because it is relatively easy to use, relatively inexpensive, has great flexibility, and is easily transportable: it can go to teachers; teachers need not go to it.

Television, as has been well established, is also a very viable instructional technology, through it tends to be more expensive and less flexible than the videotape. Although we tend to think of instructional television as the airing of prepared programs for broad, general use, there are cited in the literature innovative uses of television that can provide highly individualized instruction. Kirman and Goldberg (1981), in an article entitled "Distance Education: Teacher Training Via Live Television and Concurrent Group Telephone Conferencing," describe a creative and cost efficient use of a " . . . combination of one-way television with group telephone conferencing . . . [to provide] . . . a way of reaching teachers scattered in different locations

using an instructor operating out of a central location." According to the researchers, this mode of teaching appears to be as effective as face-to-face instruction. Given the unique and particularly relevant nature of this technology, a copy of the articule is included with this review as Attachment G. A similar use of a coordinated television-telephone system is described by Heller (1975) and was used by school board, school administrator, and teaching staff to meet a broad array of communications needs.

Computer-Based Training Systems. The literature cites several uses of the computer as a technology for providing inservice training to teachers. A system that has been used quite extensively, and successfully, is the CATTS: Computer-Assisted Teacher Training System. Research with this system by Ballard (1976), Semmel (1976), and Husselbring (1979) has demonstrated the effectiveness of using a computer-based training system to improve teachers' ability to give more positive reinforcment to low social status children, significantly increase and improve teacher interactions with moderately retarded students, and provide better instruction to handicapped children in the areas of reading and listening, comprehension, and language.

With the onset of microcomputer technology which will make it possible for schools to purchase their own computer hardware, it is reasonable to assume that teacher inservice training via computer technology will be readily available within the near future. This eventuality needs to be watched carefully since it has tremendous implication for educators in rural areas.

TECHNOLOGY WHICH SEEMS TO BE PARTICULARLY RELEVANT TO THE NEEDS IDENTIFIED DURING THE NEEDS ASSESSMENT

During the needs assessment, eleven (11) areas of needs were identified and ranked (see Table 1). In this section of the review, an

Table 1.

Needs That Could Be Served With Technology

Rank	Needs	BOCS					
		Northeast	South Platte	Mountain	Pikes Peak	San Luis	Southeast
1	Sp. ed. students assigned to regular classes need to have instructional programs that allow them to work independently.	✓*	✓	✓	✓	✓	✓
1	Reg. ed. teachers need practical help in how to serve sp. ed. students assigned to the regular programs.	✓	✓	✓	✓	✓	✓
2	There is need for better communication among everyone involved in a student's educational program: sp. ed. teacher, reg. ed. teacher, OT/PT, speech therapist, other agencies.	✓	✓	✓		✓	✓
2	Sp. ed. teachers need to be kept abreast of new ideas and information about sources of support such as instructional materials.	✓	✓		✓	✓	✓
3	BOCS administrators need to be able to more adequately communicate with the field.	✓		✓		✓	✓
3	Sp. ed. needs to be able to maintain adequate communication with the community.	✓	✓	✓		✓	
4	School equipment needs to be made more adequate.	✓		✓		✓	
4	Secondary level programs need to be structured, especially vocational training programs.	✓			✓	✓	
5	There needs to be more interaction between regular and sp. ed. teachers.	✓				✓	
6	Noncertified teachers need in-service training.	✓					
6	There is a need for a well-defined staff development program.	✓					

*A check in a cell indicates that the need was identified by that BOCS. The frequency with which it was identified varied according to the number of persons participating in the needs assessment activity. For example, four participants in the Northeast BOCS identified the need for instructional programs that special education students could use independently.

attempt has been made to match technologies that were cited in the literature with the eleven needs.

Need

-- Instructional programs that allow special education students in the regular class to work independently.

Available Technology

Technology does not yet seem to exist that broadly addresses this area of need in a cost efficient manner. Although there are a number of commercially available instructional materices (e.g., Systems 80) that are intended for individual student use, technologically based systems such as computers are not in evidence for classroom use. Considerable research is being, and has been, done in this area, and the hope for the future is that something viable will emerge.

One exception to the lack of such technology at that classroom level are the instructional programs available from the Outreach Division of the Exceptional Child Center at Utah State University in Logan, Utah. Available there are several packaged, self-contained programs of instruction that special education students can use independently.* Though limited in the sense that not all subject matter areas are covered (emphasis is on the development of basic skills) and not all handicapping conditions are addressed, the packets have been well received and have been shown scientifically to be effective.

Needs

-- Help for regular education teachers who have special education students assigned to their classes.

*No instructional program can literally be used independently. Without exception, the teacher must be involved in knowing which "package" the student is to experience, guiding the student in his/her academic program, assessing the program, providing remediation experience, etc.

--Help for teachers to be kept abreast of new ideas, information, and sources of support.

-- Inservice training for uncertified teachers and for general staff development.

Available Technology

These needs have been grouped together since they could all be addressed by using a similar technology.

Judging from what has been cited in the literature, it seems reasonable to suggest that all of these needs could be well met with a coordinated use of videotapes, television, and prepared packages. In this regard, the work of Kirman and Goldberg (1981) seems to be particularly relevant (see Attachment G). Also, the work of Rich (1974), Guran (1976) and Heller (1975) would be worth pursuing.

There is no question that the technology exists to conduct inservice training for teachers of the handicapped in rural settings--and the training can be done effectively and economically. However, as with any new and innovative system, as noted earlier in the review, certain conditions must exist before the system can succeed.

Need: Better Communication

-- With other professionals within the system.

-- Between regular and special education personnel.

-- Between BOCS administrators and personnel in the field.

-- Between special education and the community.

Here again, a coordinated use of technology would seem to be effective. The electronic staff meeting approach of USU Extension Service which involves the use of videotapes aired over public television,

coordinated with telephone conferencing equipment, would seem to be an ideal system. This system is operational at USU and has been shown to be effective, cost efficient, and convenient and easy to use.

To maintain contact between home and school, the use of the telephone as described in the Telepac System (Hofmeister and Atkinson, 1973), the use of recorded telephone messages to parents as described by Bittle (1975), and telephone hookup between home and classroom would seem to be intact systems that could be easily and inexpensively installed.

Need

-- Programs at the secondary level, especially vocational training programs.

Available Technology

Aside from the CATTS program (Ballard, 1976; Semmell, 1976; and Husselbring, 1976), there was little cited in the literature relative to the use of technology specifically related to vocational training programs for the handicapped at the secondary level. It is evident that more searching needs to be done in this area. Finding a dearth of references to secondary level programs comes as no surprise since it is at the secondary level where so little help of any kind is available.

Perhaps it is because they are already commercially available and not necessarily geared to handicapped or rural populations that no references were found to the use of multimedia training units that are used to train secondary level students in a variety of skills: small engine repair, use of tools, plumbing, electrical work, carpentry, etc. These units, in use in many vocational training centers, are in the form of a study carrell where the student is instructed via continuous loop

film to perform certain tasks. The carrell is equipped with everything that is needed to perform the task. Although these units have been demonstrated to be effective, they are expensive. Cost efficiency is realized only when the units are used with large numbers of students. Also, the skills that are taught generally relate to the work forces of large centers of population.

Need

-- Adequate school equipment.

Available Technology

What is adequate is a function of what a school system needs; can afford to purchase, operate, and maintain; and will use. Based on the author's experience, and that of others cited in the literature (Tyler, 1980; Heath and Orlich, 1977; Perry and Perry, 1981; and Locatis and Atkinson, 1976), selecting adequate instructional technology equipment is a matter that demands thoughtful care and study. The expense alone is reason enough to be cautious. A few guidelines bear consideration:

-- Equipment should follow the instructional needs. Too often expensive, sophisticated equipment is purchased before the instructional ends to which it is to be put are identified.

-- Equipment is no better than how it is used. Before equipment can serve its purposes well, it must be used well by knowledgeable people. In those schools/districts where trained media personnel are employed, the probability is much higher that expenditures on equipment are more reasonable, more functional equipment are purchased, equipment is in better repair, and equipment is used more effectively for instructional purposes.

--Educational technology is a rapidly growing field with which educators should keep abreast. Research and innovation are incessently expending the availability and use of equipment for instructional purposes. This phenomenon behoves educators at all levels to keep abreast of what is happening so that the best that is available is put to use on behalf of the instructional needs of children. It has been noted that before a proven instructional method or technology is implemented in the classroom, it is already 50 years old. Such a circumstance is unforgivable.

MODELS FOR IMPLEMENTING TECHNOLOGY

As observed by White (1981), the capacity to teach with electronic devices far out distances what is being done with them in the schools. One reason for this is that inadequate forethought, planning, and preparation have gone into the implementation of technological systems. To help span the gap between capacity and utilization, models have been developed which cue the innovator to those matters that must be considered and attended to if the desired impact of the innovation is to be realized. These models are designed to increase the impact of any type of innovation--not just technology, address such practical matters as the role of the administrator in the use of technology*, phasing technology into a school system, piloting the technology in a school setting, and social variables that need to be considered, i.e., public resistance to the use of "new fangled machines." As noted by Havelock and Lindquist,

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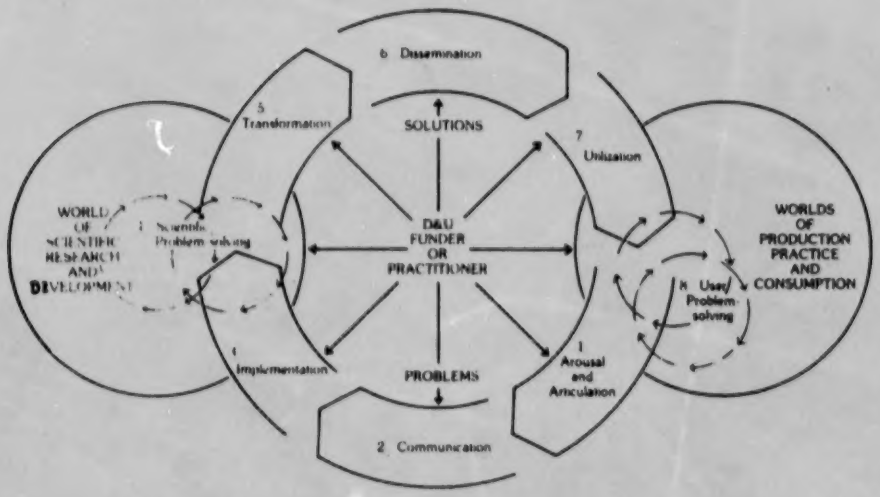
*In this instance, the word technology is used in place of the more generic term innovation.

> "It is helpful to picture three distinct processes in seeking improvements through model programs: generation, dissemination, and utilization. . .The new thing must be transmitted from its place of origin elsewhere in order that others use it. . .Just getting an innovation from developer to audience is not the object of either development or "dissemination". The object is use of that model by its audience, and that process is called utilization. p.6. (underlining added)

To guide the innovator, Havelock and Lindquist have developed a "linkage model for planned changes." The model, reproduced below, identifies eight stages, each of which is described in Attachment I. Though other models are available, it is the author's opinion that they are no more functional than Havelock's and Lindquist's; thus, others are not included in this review. However, if the reader is interested in pursuing this matter further, he/she is referred to the W. K. Kellogg Foundation publication, Increasing The Impact of Social Innovations, edited by Jack Lindquist and available from the W. K. Kellogg Foundation, Battle Creek, Michigan.

The Eight Stages of the Linkage Perspective



* * * *

This review is an initial effort to identify technology that can be used in Colorado to meet the needs of special educators and special students located in the rural areas of the state. Should it become necessary--based on the perceptions of the users of this review and/or the results of the workshops and follow up visits that are forthcoming (see PAAs CO-01-03 and CO-01-04)--additional searches will be made to learn more about available technologies to meet rural Colorado's special education needs.

Again, it must be remembered that this review was not exhaustive relative to the use of technology in special education. Rather, it was deliminated to the needs identified during the needs assessment process (PAA CO-01-01).

* * * *

Regarding the Attachments:

The attachments that follow contain additional references to the use of technology, and in some instances, particularly relevant articles are copied in full. Also, since some references relate to specific handicapping conditions, the attachments have been grouped accordingly.

Attachment H contains a literature review which addresses technology in special education from a broad perspective. Though not directly related to the concerns addressed by this review, it highlights several relevant points which should be noted when one is considering the use of technology in a special education setting.

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Havelock, R. G., & Lindquist, J., A conceptual framework for increasing the impact. In Increasing the Impact of Social Innovation. Battle Creek, Michigan: The Kellogg Foundation.

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Heath, S., & Orlich, D. Determining costs of educational technology: An exploratory review and analysis. Educational Technology, XVII, February, 1977, 26-33.

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Russell, J. The ways you always wanted to teach--but were afraid to try. Educational Technology, XV, June, 1975, 9-19.

Semmel, M., & Others. The effectiveness of a computer-assisted teacher training system CATTS) in the development of reading and listening comprehension instructional strategies of preservice special education trainees in a tutorial classroom setting final report 53.4. Bloomington, IN: Indiana University, August, 1976.

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White, M.A. Into the electronic era: Implications for education and psychology. Educational Technology, September, 1981, 9-12.

ATTACHMENTS

A. Additional References to the Use of Television

B. Additional References to the Use of Videotapes

C. Additional References to the Use of Computer Assisted Instruction

D. Additional References to the Use of the Telephone

E. Additional References to the Use of Packaged Programs and Instructional Modules.

F. Additional References to the Use of Other Media

G. Reprint of the Kirman, Goldberg Article

H. "Technology in Special Education"
A Literature Review by Blackhurst and Hofmeister

I. Havelock's and Lindquist's Implementation Model

J. Telecommunications in Rural America: Special Population. Special Problems

Attachment A

Additional References on the Use of Television

DEAF

EJ230419 EC124698
Using CCTB at Nutfield Priory.
Faragher, Kenneth
Special Education: Forward Trends, v7 n1 p28 Mar 1980
Reprint: UMI
Language: English
Document Type: PROJECT DESCRIPTION (141); JOURNAL ARTICLE (080)
The use of closed circuit television to teach language and speech to congenitally deaf secondary school children in England is discussed. The equipment enables the staff to record material and add subtitles before showing it to the students. (PHR)
Descriptors: *Closed Circuit Television; *Congenital Impairments; *Deafness; Educational Equipment; Foreign Countries; *Language Acquisition; Program Descriptions; Secondary Education; *Speech Instruction
Identifiers: Great Britain

EMOTIONALLY DISTURBED

EC121030
the effects of televised modeling on selected pro-social behaviors of severely withdrawn children.
Kassier, Marjorie Rose
1979- 150P.
Note: columbia university teachers college
UMI, P.O. Box 1346, Ann Arbor, MI 48106 ($22.00 hard copy, $11.00 microfiche) Catalogue No. 7913202
EDRS: NOT AVAILABLE
twenty severely withdrawn emotionally disturbed children (9 to 14 years old) exposed to a videotape showing cooperative prosocial interaction between models engaged in more associative and cooperative behaviors than comparably withdrawn ss exposed to a videotape showing no social interaction between models. (Cl)
Descriptors: exceptional child research/ *emotionally disturbed/ childhood/ *social development/ *interpersonal competence/ videotape recordings/ *modeling (psychological)

EJ216170 EC121709
Helping Emotionally Disturbed Children Through Prosocial Television.
Elias, Maurice J.
Exceptional Children, v46 n3 p217-18 Nov 1979
Language: ENGLISH
Document Type: JOURNAL ARTICLE (080); RESEARCH REPORT (143)
The effects of videotapes of situations depicting coping difficulties (along with group discussion) on the prosocial behavior of 109 emotionally and academically handicapped boys (ages 7 to 15) in a residential treatment center were studied. Findings showed that Ss in the treatment group improved in their abilities to exercise self-control. (PHR)
Descriptors: *Academically Handicapped; *Behavior Change; Closed Circuit Television; *Coping; Elementary Secondary Education; *Emotional Disturbances; Exceptional Child Research; Males; *Prosocial Behavior; Residential Institutions; Self Control; *Videotape Recordings

EJ192901 PS507193
Television's Impact on Emotionally Disturbed Children's Value Systems.
Donohue, Thomas R.
Child Study Journal, v8 n3 p187-202 1978
Reprint: UMI
Language: ENGLISH
This investigation studied the influences of television's behavioral models on institutionalized, emotionally disturbed children between the ages of 8 and 11. Investigated were children's perceptions and judgments of right and wrong, appropriate and inappropriate behaviors. (SE)
Descriptors: Elementary School Students; *Emotional Disturbances; *Handicapped Children; Identification (Psychology); *Modeling (Psychology); *Moral Values; Socialization; *Television Viewing

Attachment B

Additional References on the Use of Videotapes

BEHAVIORALLY DISORDERED

EC121910
Use of Video Replay with Disturbed Children (In Videotape Techniques in Psychiatric Training and Treatment. Revised Edition).
Morse, Philip C.
1978- 11P.
Note: In Milton M. Berger, Ed., Videotape Techniques in Psychiatric Training and Treatment. Revised Edition, Chapter 22, pages 258-68
Brunner/Mazel, Inc., 19 Union Square, New York, NY 10003 ($20.00)
EDRS: NOT AVAILABLE
Videotaped focused feedback is useful in treating children with problems related to impulse control, reality testing, and low self esteem. The observation, clarification, and labeling of appropriate and inappropriate feelings and actions help children gain greater mastery and control over their own behavior and a more realistic view of themselves and the outside world. Three case studies illustrate the improvement of children treated using videotaped feedback. (Author/PHR)
Descriptors: *Emotionally Disturbed/ Exceptional Child Research/ Case Studies/ *Self Esteem/ *Self Control/ *Behavior Change/ *Feedback/ Videotape Recordings/ *Emotional Response

DEAF

A Videotape Series for Teaching Job Interviewing Skills.
Veatch, Deborah J.
American Annals of the Deaf (Back to Media: How to Use Better What You Already Have) v125 n6 p747-50 Sep 1980; 1980-Sep 4P.
UMI
EDRS: NOT AVAILABLE
Videotapes designed to teach job interview skills to deaf students were developed. Three interview situations featuring one hearing and two hearing impaired persons are presented in the videotapes. (CL)
Descriptors: *Deafness/ *Employment Interviews/ *Videotape Recordings/ *Role Playing

EJ236797 EC131518
A Videotape Series for Teaching Job Interviewing Skills.
Veatch, Deborah J.
American Annals of the Deaf, v125 n6 p747-50 Sep 1980
Reprint: UMI
Language: English
Document Type: JOURNAL ARTICLE (080); TEACHING GUIDE (052)
Videotapes designed to teach job interview skills to deaf students were developed. Three interview situations featuring one hearing and two hearing impaired persons are presented in the videotapes. (CL)
Descriptors: *Deafness; *Employment Interviews; *Role Playing; *Videotape Recordings

EMOTIONALLY DISTURBED

EJ216114 EC121338
The Therapeutic Use of Edited Videotapes with an Exceptional Child.
Greelis, Michael; Kazaoka, Katsushige
Academic Therapy, v15 n1 p37-44 Sep 1979
Reprint: UMI
Language: ENGLISH
Document Type: JOURNAL ARTICLE (080); RESEARCH REPORT (143)
The effect of edited videotapes combining self-modeling stimuli with cartoon reinforcements on the tantrum behavior of a seven-year-old schizophrenic retarded girl was evaluated. Results demonstrated a correlation between the videotape intervention and substantial reduction of tantrum behaviors along with an increase in task persistence. (CL)
Descriptors: *Behavior Change; *Emotional Disturbances; Exceptional Child Research; *Mental Retardation; *Modeling (Psychology); Multiple Disabilities; Reinforcement; Schizophrenia; Self Control; *Videotape Recordings

LEARNING DISABLED

ED165784 IR006843
Using Videotape in a Multimedia Approach to Teaching Language Skills to Learning Disabled Adolescents.
Brannan, Pamela J.
Howard School, Inc., Atlanta, Ga.
Apr 1978 17p.; Paper presented at the annual meeting of the Association for Educational Communications and Technology (Kansas City, Missouri, April 1978)
Sponsoring Agency: Office of Education (DHEW), Washington, D.C.
Grant No.: G007603630
EDRS Price - MF01/PC01 Plus Postage.
Language: English
Document Type: CONFERENCE PAPER (150)
Geographic Source: U.S.; Georgia
Journal Announcement: RIEJUN79
Some general approaches to individualized tutorial instruction are described with specific examples of a multimedia model for learning used with one 13 year old learning disabled student deficient in language skills. The model is presented in the form of a wheel, with a topic, theme, concept, or content area at the hub; radiating out from the center are seven overlapping areas of media including stage, design, print, photography, radio, movies, and television. Specific learning activities for each of the media are outlined, e.g., writing scripts of familiar stories for films and television. An annotated bibliography of sources and resources on multimedia instruction is included. (CMV)
Descriptors: *Academically Handicapped; Adolescents; Annotated Bibliographies; *Case Studies; *Individualized Instruction; *Language Skills; *Models; *Multimedia Instruction; Secondary Education; Special Programs; Teaching Methods; Videotape Recordings

MENTALLY RETARDED

ED131611 EC091805
Programmatic Research to Develop and Disseminate Improved Instructional Technology for Handicapped Children. Quarterly Progress Report, February 1, 1974 to June 1, 1974.
Schiefelbusch, Richard L.; Lent, James R.
Kansas Univ., Lawrence. Bureau of Child Research.; Parsons State Hospital and Training Center, Kans.
1 Jun 1974 92p.; For related documents, see EC 091 803-804
Sponsoring Agency: Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C.
Bureau No.: 26-2364
Grant No.: OEG-0-71-0449(607)
EDRS Price - MF01/PC04 Plus Postage.

Language: ENGLISH
Document Type: RESEARCH REPORT (143)
Journal Announcement: RIEAPR77
Presented is a quarterly progress report of Project MORE (Mediated Operational Research for Education), a research project developing multimedia instructional programs aimed at specific behavioral deficits among handicapped children, with emphasis on self-care skills for the mentally retarded and articulation therapy in public schools. Major activities and accomplishments, problems, significant findings and events, dissemination activities, capital equipment acquisitions, data collection, other activities, staff utilization, and future activities planned for the next reporting period are recorded for each of four areas of the project: Curriculum Materials for the Mentally Retarded; Research, Development, and Dissemination of Programs for Improved Instructional Technology for Articulation Therapy in Public Schools; Media Support Services; and Systems Analysis. Appended are the vitae of three staff members, and a technical report titled "Instructional Program Evaluation: Goodness of Fit Between Questions and Instruments" (I. Kelitz). (IM)
Descriptors: Articulation (Speech); Behavioral Objectives; Behavior Development; *Curriculum Development; Exceptional Child Education; *Handicapped Children; *Instructional Programs; *Mental Retardation; *Multimedia Instruction; *Reports; *Research Projects; Self Care Skills; Systems Analysis; Systems Approach
Identifiers: *Project MORE

ED163692 EC112621
Comparison of Audiovisual and Traditional Methods for Teaching Language Concepts to Retarded Children.
Striffler, Nancy; And Others
1977 11p.
EDRS Price - MF01/PC01 Plus Postage.
Language: English
Document Type: RESEARCH REPORT (143)
Geographic Source: U.S.; District of Columbia
Journal Announcement: RIEMAY79
A videotape designed to teach the color red to 18 retarded children (ages 3-5 years) was tested in comparison to traditional methods of instruction. The children were divided into three groups, one viewed the experimental videotape, one traditionally taught videotape, and one a non-televised traditional presentation, each was instructed by the selected method twice a day for four consecutive days. No significant difference was found among the three conditions. Results suggest that presentation of common objects, familiar child-like situations, and requests for viewer participation were most successful in gaining orientation; and that television instruction might be an effective tool in the language development program of retarded children. (Author/PHR)
Descriptors: Educational Television; Instructional Innovation; *Language Acquisition; *Mental Retardation; Orientation; Student Participation; *Teaching Methods; *Videotape Recordings

ED147620 08 CE014098
A Work Experience Video Tape Satellite Project for EMR Students. Final Report.
Caci, William P.
Pennsylvania Research Coordinating Unit for Vocational Education, Harrisburg.
29 Dec 1977 43p.
Sponsoring Agency: Bureau of Occupational and Adult Education (DHEW/OE), Washington, D.C.
Bureau No.: 19-6815
EDRS Price - MF01/PC02 Plus Postage.
Language: ENGLISH
Document Type: PROJECT DESCRIPTION (141)

Journal Announcement: RIEMAY78
A project produced and field tested a selected set of video tapes and instructional material illustrating actual student performances and job requirements while on a high school work experience program. Objectives were (1) to enhance on-the-job student performances via immediate audio and visual feedback, (2) to establish a library of realistic videotapes of students performing in local occupations and businesses, (3) to supply prevocational instructors with career awareness tools, (4) to illustrate to all interested parties the performance and degree of involvement of students in the work program, (5) both to provide prospective employers an overview of work program students and to compliment the involvement of employers now involved with the program, and (6) to bolster confidence and self-esteem of students in the work program, especially educable mentally retarded (EMR) students. Portable videotape equipment was used to tape performances of students actually working on their respective jobs. Unedited tapes were shown to students for work evaluation purposes. Then tapes were edited into ten- to fifteen-minute presentations, and teacher packets of lesson plan material were developed for each. Packets and tapes were field tested at junior and senior high and college levels. The overall conclusion is that all objectives were met, with most success in objectives 3 and 6. A list of the tapes by occupation and three sample teacher packets are appended. (JT)
Descriptors: Career Exploration; Instructional Materials; Lesson Plans; *Material Development; *Mild Mental Retardation; Prevocational Education; Public Relations; Student Evaluation; Teaching Methods; *Videotape Recordings; *Vocational Education ; *Work Experience Programs

ED131645 EC091912
A Study of Behavioral Change in 50 Severely Multi-Sensorily Handicapped Children Through Application of the Video-Tape Recorded Behavioral Evaluation Protocol. Final Report.
Curtis, W. Scott
Jan 1976 173p.
Sponsoring Agency: Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C.
Bureau No.: H-232529
Grant No.: OEG-0-72-5460
EDRS Price - MF01/PC07 Plus Postage.
Language: ENGLISH
Document Type: RESEARCH REPORT (143)
Journal Announcement: RIEAPR77
Examined with 49 deaf-blind children (under 9 years old) was the use of the Teledlagnostic Behavior Evaluation Protocol, a video-tape recorded evaluation protocol. To further develop the Teledlagnostic Protocol and delineate the characteristics of the Ss observed during the process of test development, Ss were video-taped in eight 3-minute behavioral observation situations on three occasions at yearly intervals. Three judges recorded the observed behaviors (such as sensory reception, coordination, oral speech, eating, memory, sense of humor, and problem-solving skill). Analysis of results indicated that the test correlated to a statistically significant degree with standardized psychometrics and teacher ratings, that groups of judges did not score significantly differently, that the two halves of the test were significantly correlated, that the population changed over test administrations to a significant degree, and that the population presented different levels of behavior in the test situations to a significant degree. Data supported the validity and reliability of the test procedure. (Approximately half of the document consists of appended material such as the behavior rating form and results in tabulated form.) (IM)
Descriptors: Behavior Change; *Behavior Rating Scales; *Deaf Blind; Exceptional Child Research; Observation; Severe Disabilities; *Test Construction; Test Reliability; Test Validity; *Videotape Recordings; Young Children
Identifiers: Final Reports; *Teledlagnostic Protocol

Attachment C

Additional References on the Use of Computer Assisted Instruction

ED129270 IR004052
CAI in a School for the Deaf: Expeded Results and a Serendipity or Two.
Fricke, James E.
Scranton State School for the Deaf, Pa.
Aug 1976 6p.; Paper presented at the Association for the Development of Computer-Based Instructional Systems Summer Conference (Minneapolis, Minnesota, August 10-12, 1976)
EDRS Price - MF01/PC01 Plus Postage.
Language: ENGLISH
Document Type: CONFERENCE PAPER (150)
Journal Announcement: RIEFEB77
In September 1975, the Computer Curriculum Corporation's computer assisted instruction program was instituted at the Scranton State School for the Deaf in Scranton, Pennsylvania. A minicomputer and 20 teletype terminals were installed. Drill and practice programs in elementary level math, reading and language arts were initiated. Teachers' reactions to the first year's experience were enthusiastic. Specific complaints were aimed at the level and limitations of the curriculum. Everyone agreed that the system was appropriate for the school population. The total cost of the system projected for five years was estimated at $180,000. Based on the first year's average of 1.7 hours of use per student per week, the average cost per student hour was $3.80. In the first year middle school students averaged a 1.3 grade level gain in math and a .4 gain in reading. High school students showed a 1.1 grade level gain in math and 1.3 in reading. The dramatic story of one student's gains using the system added to the positive evaluation of the program. (KB)
Descriptors: Academic Achievement; *Computer Assisted Instruction; Costs; *Deafness; Elementary Secondary Education; Minicomputers; *Special Education; Teacher Attitudes
Identifiers: ADCIS 76

ED129273 IR004056
Computer-Assisted Instruction at Kendall Demonstration Elementary School.
Nomeland, Ronald E.; Harris, Rachel
Kendall School for the Deaf, Washington, D.C.
10 Aug 1976 8p.; Paper presented at the Association for the Development of Computer-Based Instructional Systems Summer Conference (Minneapolis, Minnesota, August 10-12, 1976)
EDRS Price - MF01/PC01 Plus Postage.
Language: ENGLISH
Document Type: CONFERENCE PAPER (150)
Journal Announcement: RIEFEB77
A computer-assisted instruction (CAI) laboratory provides deaf students at Kendall School in Washington, D.C. with drill and practice exercises in mathematics. The Stanford-developed curriculum offers two basic math options--fixed and mixed strand. During the first full year of operation, CAI math was offered to 111 students, ages 8-15. Stanford Achievement Test (SAT) results were used to check the achievement gains of students using the program. Twenty out of 28 lower elementary students achieved at least one grade level in math; eight achieved two years. Fifteen out of 33 upper elementary students demonstrated a one grade increase; eight out of 23 middle school students increased one grade or more. The lower achievement gains for middle school students were attributed to the fact that most of them remained in mixed strand programs for most of the year and that their SAT level test scores may have been less valid. (KB)
Descriptors: Academic Achievement; *Computer Assisted Instruction; *Deafness; Elementary Secondary Education; Mathematics Instruction; *Special Education
Identifiers: ADCIS 76

ED160085 IR006244
The Role of CAI and Video Tapes as Instructional Supplements to an English Language Program for the Hearing Impaired.
Madachy, James L.; Miller, J. Douglas
Mar 1978 7p.; Paper presented at the Annual Meeting of the Association for the Development of Computer Based Instructional Systems (Dallas, Texas, March 1-4, 1978); For related document, see IR 006 231
EDRS Price - MF01 Plus Postage. PC Not Available from EDRS.
Language: English
Document Type: CONFERENCE PAPER (150)
Geographic Source: U.S.; District of Columbia
Journal Announcement: RIEFEB79
The creation and use of CAI and videotapes as methods for improving the English language skills of the hearing impaired during the past three and one half years at Gallaudet College are described. The first part of the paper discusses CAI as a working system within a total English language program; the second part discusses efforts to integrate CAI with videotapes as a means of increasing the effectiveness of English language instruction. Although some testing of these materials has been completed, the relationship between student exposure to these materials and overall improvement in English language skills needs to be researched and documented. (Author/VT)
Descriptors: *Computer Assisted Instruction; *Deafness; *English (Second Language); Instructional Design; *Instructional Systems; *Special Education; Systems Development; *Videotape Recordings

EJ194577 IR506182
Development of a PLATO Based Curriculum for Tactile Speech Recognition.
Saunders, Frank A.; And Others
Journal of Educational Technology Systems, v7 n1 p19-27 197 1978
Language: ENGLISH
Describes a PLATO-based curriculum for teaching profoundly deaf children to understand speech sounds, which are presented as touch patterns on the abdomen. PLATO's auditory disk output is used to speak words and phrases which are converted to touch patterns via a new sensory aid, the teletactor. (Author/JEG)
Descriptors: *Computer Assisted Instruction; Deafness; Educational Innovation; *Hearing Impairments; *Language Instruction; Research; *Sensory Aids; Special Education
Identifiers: *PLATO

EJ216200 EC121852
Interfacing an Inexpensive Home Computer to the Videodisc: Educational Applications for the Hearing Impaired.
Galbraith, Gary; And Others
American Annals of the Deaf, (Educational Technology for the '80's) v124 n5 p536-41 Sep 1979
Reprint: UMI
Language: ENGLISH
Document Type: JOURNAL ARTICLE (080); CONFERENCE PAPER (150); PROJECT DESCRIPTION (141)
Originally part of a symposium on educational media for the deaf, the article describes the use of computer-assisted instruction to teach young deaf and multiply handicapped children. The microcomputer/videodisc interface is explained and the method of captioning the videodisc is discussed. Diagrams illustrate the process. (PHR)
Descriptors: *Captions; *Computer Assisted Instruction; Conferences; *Deafness; Early Childhood Education; Educational Media; *Educational Technology; *Hearing Impairments; Home Instruction; *Multiple Disabilities; Teaching Methods; Young Children

EJ216212 EC121864
Games and Simulation Studies for the Deaf.
Smith, Harry
American Annals of the Deaf, (Educational Technology for the '80's) v124 n5 p611-15 Sep 1979
Reprint: UMI
Language: ENGLISH

Document Type: JOURNAL ARTICLE (080); CONFERENCE PAPER (150); TEACHING GUIDE (052)
Originally part of a symposium on educational media for the deaf, the paper presents guidelines and suggestions for the use of games and simulations in the education of this population. Steps in the design of games, such as determining the educational goals and objectives of the games, are discussed. (PHR)
Descriptors: Conferences; *Deafness; *Educational Games; *Educational Innovation; *Educational Media; Elementary Secondary Education; Evaluation Methods; Guidelines; *Hearing Impairments; *Simulation

EJ224107 IR507975
Instructional Development Related to an Intelligent Videodisc.
LaGow, Robert L.
Journal of Educational Technology Systems, v8 n3 p231-39 197 1979
Language: English
Document Type: JOURNAL ARTICLE (080); PROJECT DESCRIPTION (141)
Describes some general characteristics of the deaf learner and discusses the videodisc as a means for marketing computer-based visual instructional materials, hardware functions, and possible design approaches using a variety of instructional techniques. (Author/JEG)
Descriptors: Deafness; *Hearing Impairments; *Instructional Design; *Videodisc Recordings
Identifiers: *Intelligent Videodisc

EJ236809 EC131530
Microcomputers in the Service of Students and Teachers--Computer-Assisted Instruction at the California School for the Deaf: An Update.
Arcanin, Jacob; Zawolkow, Geoffrey
American Annals of the Deaf, v125 n6 p807-13 Sep 1980
Reprint: UMI
Language: English
Document Type: JOURNAL ARTICLE (080); PROJECT DESCRIPTION (141)
A regional center has been established which focuses on training teachers to develop computerized lessons. The lessons are categorized and stored in a lesson library to which all teachers have access. (CL)
Descriptors: *Computer Assisted Instruction; *Deafness; Elementary Secondary Education; *Microcomputers; Program Descriptions; *Teacher Developed Materials
Identifiers: California School for the Deaf

DEAF-BLIND

EC121875
Computer-Supported Braille Applications.
Torr, Donald
American Annals of the Deaf (Educational Technology for the '80's) v124 n5 p691-95 Sep 1979; 1979-Sep 5P.
Note: For complete symposium, see EC 121 849-876
UMI
EDRS: NOT AVAILABLE
Originally part of a symposium on educational media for the deaf, the paper reports on developments which enable computer conversion of text into grade 2 braille text, especially useful for deaf blind students. The steps in the conversion of a text are outlined and future applications, such as a computerized message system, are explored. (PHR)
Descriptors: Severely Handicapped/ *Deaf Blind/ Aurally Handicapped/ Elementary Secondary Education/ Post Secondary Education/ Symposia/ *Computer Assisted Instruction/ *Educational Technology/ *Instructional Media/ *Braille/ *Instructional Materials/ Computer Science

EJ236814 EC131535
Computer-Aided Instruction at the Florida School for the Deaf and the Blind.
Hoffmeyer, Dennis B.
American Annals of the Deaf, v125 n6 p834-40 Sep 1980
Reprint: UMI
Language: English
Document Type: JOURNAL ARTICLE (080); PROJECT DESCRIPTION (141)
The computer assisted instruction (CAI) center at the Florida School for the Deaf and the Blind is described in terms of scheduling; monitoring of student progress in mathematics, language, and reading; comparing student achievement; and funding. (CL)
Descriptors: Blindness; *Computer Assisted Instruction; *Deafness; Program Descriptions; Residential Schools; Teaching Methods
Identifiers: Florida School for the Deaf and the Blind

EJ216211 EC121863
Media-Based Interactive Visual Image-Controlled (Vis-I-Con) Instruction Delivery System for Instruction of Deaf and Hearing-Impaired.
Fox, Raymond
American Annals of the Deaf, (Educational Technology for the '80's) v124 n5 p604-10 Sep 1979
Reprint: UMI
Language: ENGLISH
Document Type: JOURNAL ARTICLE (080); CONFERENCE PAPER (150); PROJECT DESCRIPTION (141)
Originally part of a symposium on educational media for the deaf, the paper describes a programmable media-based microprocessor-controlled interactive instruction delivery system using super 8 film and addressable audiotape messages, the Vis-I-Con system. (Author/PHR)
Descriptors: Computer Assisted Instruction; Conferences; *Deafness; Delivery Systems; *Educational Media; *Educational Technology; *Hearing Impairments; *Instructional Improvement; Tape Recordings; *Videotape Recordings
Identifiers: *Vis I Con System

EJ216223 EC121875
Computer-Supported Braille Applications.
Torr, Donald
American Annals of the Deaf, (Educational Technology for the '80's) v124 n5 p691-95 Sep 1979
Reprint: UMI
Language: ENGLISH
Document Type: JOURNAL ARTICLE (080); CONFERENCE PAPER (150); PROJECT DESCRIPTION (141)
Originally part of a symposium on educational media for the deaf, the paper reports on developments which enable computer conversion of text into grade 2 braille text, especially useful for deaf-blind students. The steps in the conversion of a text are outlined and future applications, such as a computerized message system, are explored. (PHR)
Descriptors: *Braille; *Computer Assisted Instruction; Computer Science; Conferences; *Deaf Blind; *Educational Media; *Educational Technology; Elementary Secondary Education; Hearing Impairments; *Instructional Materials; Postsecondary Education; Severe Disabilities

MENTALLY RETARDED

ED157333 EC111818
The Instructional Use of CAI in the Education of the Mentally Retarded.
Winters, John J., Jr.; And Others
Jun 1978 13p.; Paper presented at the World Congress on Future Special Education (First, Stirling, Scotland, June 25 - July 1, 1978)
EDRS Price - MF01/PC01 Plus Postage.
Language: ENGLISH
Document Type: CONFERENCE PAPER (150)
Journal Announcement: RIEDEC78
Computer assisted instruction (CAI) studies with the mentally retarded in the United States and Canada reveal that the retarded benefit from CAI in academic and social skills. Their learning is enhanced to the same extent as that of the nonretarded. CAI can be cost-effective, especially with the reduced costs of mini and micro-computers; however, available computer programs are not developed specifically for this population. An integration of available low cost computers and dedicated high quality computer programs is required if the mentally retarded are to benefit from CAI courseware. (Author/SBH)
Descriptors: *Computer Assisted Instruction; Cost Effectiveness; Elementary Secondary Education; *Mental Retardation; Research Reviews (Publications)

EJ189125 IR505795
Computer-Assisted Instructional Programs to Facilitate Mathematical Learning Among the Handicapped
Vitello, S. John; Bruce, Patricia
Journal of Computer-Based Instruction, 4, 2, 26-9 1977
Reprint Available (See p. vii): UMI
Language: English
Two mathematics programs developed for presentation via computer-assisted instruction are discussed: . ADD, a computer-based program designed for the mentally handicapped child who requires frequent successes in initial learning; and SHAPE, a program demonstrating the development of quantitative concepts. (RAO)
Descriptors: *Computer Assisted Instruction; Elementary Education; *Mathematics Instruction; *Mental Retardation; Success

ED166913 EC113681
Demonstration of the Use of Computer-Assisted Instruction with Handicapped Children. Final Report.
Chiang, Alice; And Others
RMC Research Corp., Arlington, Va.
Sep 1978 82p.
Report No.: 446-AH-60076A
EDRS Price - MF01/PC04 Plus Postage.
Language: English
Document Type: PROJECT DESCRIPTION (141)
Geographic Source: U.S.; Virginia
Journal Announcement: RIEJUL79
The report describes ASSIST, a teacher-controlled computer assisted instruction (CAI) system in special education. Field tested with aporoximately 200 handicapped elementary and junior high students (educable mentally retarded, educationally handicapped, learning disabled, and oral language handicapped). Results are said to demonstrate that such a system can operate reliably and successfully in special education classrooms, as evidenced by ease of incorporating CAI with classroom activities, large number of lessons created by the teachers, extensive student use of the system, and positive responses from teachers and students regarding the system. Recommendations are made for continued development of ASSIST. Two appendixes contain sample ASSIST author sheets and evaluation questionnaires. (CL)
Descriptors: *Computer Assisted Instruction; Elementary Education; Exceptional Child Research; *Handicapped Children; Junior High Schools; Language Handicaps; Learning Disabilities; Mild Mental Retardation; *Program Descriptions
Identifiers: *ASSIST

SPECIAL EDUCATION (GENERIC)

EJ230383 EC124657
Computer Resources: Will Educators Accept, Reject, or Neglect in the Future?
Wieck, Colleen
Education Unlimited, v2 n3 p24-27 Apr 1980
Language: English
Document Type: JOURNAL ARTICLE (080); REVIEW LITERATURE (070)
Advantages of computer based education are discussed and the application of computer resources for students with visual and hearing impairments, mental retardation, learning disabilities, and physical handicaps is described. (CL)
Descriptors: *Computer Assisted Instruction; *Computer Oriented Programs; *Disabilities; Hearing Impairments; Learning Disabilities; Mental Retardation; Physical Disabilities; Visual Impairments

ED198792 IR009107

CAI for the Developmentally Handicapped: Nine Years of Progress.

Hallworth, H. J.; Brebner, Ann

Apr 1980 23p.; Paper presented at the Association for the Development of Computer-Based Instructional Systems (Washington, DC, March 31-April 3, 1980). For a related document, see IR 009 106.

EDRS Price - MF01/PC01 Plus Postage.

Language: English

Document Type: PROJECT DESCRIPTION (141); CONFERENCE PAPER (150)

Geographic Source: Canada; Alberta

Journal Announcement: RIEJUL81

Initiated nine years ago by the University of Calgary Faculty of Education Computer Applications Unit in cooperation with the nearby Vocational and Rehabilitation Research Institute (VRRI), this project uses computer assisted instruction (CAI) to teach social and vocational skills to developmentally handicapped young adults, many of whom also have physical handicaps. The teaching of social arithmetic and reading has necessitated the use of multi-media terminals, and several such terminals have been developed and used; the current model, based upon a microprocessor, can be adapted to the needs of the individual learner through a variety of input and output devices. Principles derived from research on learning among the retarded have been used to design two program continua aimed at enabling trainees to acquire some of the social skills needed for independent living in the community. Special input devices enable the physically handicapped to communicate more easily with the computer, and "concept keyboards" assist the retarded by reducing the amount of mental recoding required. The success of this project, now an integral part of the VRRI program, is leading to further use of CAI at the institute and in other centers. (Author/BK)

Descriptors: Arithmetic; Autoinstructional Aids; *Computer Assisted Instruction; Educational Research; Formative Evaluation; Functional Reading; History; Input Output Devices; *Instructional Design; *Man Machine Systems; *Moderate Mental Retardation; *Multimedia Instruction; Physical Disabilities; Young Adults

Identifiers: *University of Calgary (Canada)

EC121474

Special Technology for Special Children: Computers to Serve Communication and Autonomy in the Education of Handicapped Children.

Goldenberg, E. Paul

1979- 183P.

University Park Press, 233 E. Redwood Street, Baltimore, MD 21202 ($12.95)

EDRS: NOT AVAILABLE

Written for psychologists, educators, rehabilitation professionals, and scientists, the text discusses the role and application of computers in the education of the handicapped. The first section presents a philosophy of educating handicapped children; reviews the history of the application of electronic technology; and discusses the roles of the computer as tutor, eyeglasses, and mirror. Part 2 focuses on aspects of specific handicaps: cerebral palsy, motor experience, and cognitive development; deafness, language, and cognitive development; and autism, perception, and cognitive development. Two chapters in Part 3 are concerned with computer technologies; while a final chapter (Part 4) summarizes research issues regarding such topics as language, cognitive, and social development. (CL)

Descriptors: *Handicapped Children/ Elementary Secondary Education/ *Computers/ Electromechanical Aids/ *Educational Technology/ Autism/ Cerebral Palsy/ Deaf/ *Computer Oriented Programs/ Communication Skills

Title: Enhancing Communications Using an Electronic Mail System

Contact:

Strategy Setting: State of Alaska; all 51 school districts, 5 regional resource centers, and the State Department of Education

Problem: The geography of Alaska contributes to poor communications for school administration and instruction. "Mail is uncertain and slow, and reaching a person by telephone is often difficult due to overcrowded lines, differing time zones, and peoples' work schedules (Bramble, 1980)."

Strategy: Housed within the State Department of Education is an information dissemination and communications computer. Terminals are located in each school district office and in all regional resource centers. LEA administrators and instructional personnel across the state can communicate with each other through a master computer. This system may also be used for "research" purposes.

Available "research" includes Alaskan resource people and service agencies, Alaskan curriculum material, successful school programs nation-wide, and commercial resources. A brief description of the resource/program/material, where it is located, the contact person, and cost are returned to the sender in abstract form. The computer is also linked to a national data base which includes ERIC and other indexes.

A manual, written in simple language (English), demonstrates the step-by-step procedure for using the terminals. An average of only ten minutes is required to master the Electronic Mail System (EMS). Each individual is assigned a code letter which must be used to send and retrieve messages. The code is known as the "mailbox number."

Because each "mailbox" is private, the computer will not release information/messages until the individual connects to the computer by telephone and types in the "release of information" directive. Messages will remain in the "mailbox" until the individual commands their release or deletion. A number assigned to each message by the computer also appears on the printout copy received and kept by the requestor.

Messages to be sent are first typed on a diskette which acts as a word processor. The author can edit, rearrange, correct, insert, etc., while composing the message. When the individual is ready to send the message he dials the number of the computer and commands the terminal to send it. Within two minutes, a page of single-spaced typewritten material can be sent. In a span of three minutes, a person can retrieve his message and send three or four pre-recorded ones.

In addition to transmitting messages between LEAs, this computer system also stores 10 education courses. Curricular areas include English and Alaskan History at the ninth grade level. A student's progress is monitored by the master teacher using the EMS. Individualized drills, simulations, and games are sent via the EMS to the student.

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Additional usages of the district terminals include: editing drafts of documents (much like a Mag Card typewriter); district accounting; filing of student records; personnel files; and storage of mailing lists.

Potential Users: State Departments of Education; grant-writers; superintendents of LEAs; school boards; colleges and universities

Population Affected: Administrative and instructional personnel in the state of Alaska

Special Requirements: Specific questions regarding the purchase and training for the use of the computer/terminals should be directed to Dr. Bramble of the Department of Education in Alaska.

Cost: The National Institute of Education and the State of Alaska paid for the research, planning, equipment, installation, programming, training, and curricular course development. Each district pays for the telephone extension and long distance time used.

Based on FY 1980, 15 minutes of line time per week averaged $3.25 to $14.95 depending on the geographic closeness of the district terminal to the master computer.

Limitations: The initial financial investment may hinder replicability of this strategy. However, the greater the number of terminal tie-ins and users, the more the cost of the master computer service is "averaged down."

Microcomputers:
An Available Technology for Special Education

LEE MARVIN JOINER,[1] ROBERT A. SEDLAK,
BURTON J. SILVERSTEIN, and GEORGE VENSEL
Southern Illinois University at Carbondale

ABSTRACT

Microcomputers are becoming an available technology for special education. The article describes the capabilities and features of basic microcomputer systems and describes special education applications: computer assisted instruction, prosthesis, testing, communication, and enhancing personal relations. Problems such as the availability of authoring languages, high quality educational software, and computer safety are described. To include information about what microcomputers can do and how they function is recommended for teacher education and in-service programs.

Microcomputers: An Available Technology for Special Education

In its thirty years of experience, the computer has wrought profound changes in American business, government, and to a lesser extent education. While some of the larger school districts have been able to afford sophisticated computer systems for data analysis, management, and computer assisted instruction (CAI), most schools have been unable to afford their own equipment. Exercising little direct control over or responsibility for computing, schools have had their needs met by service bureaus or timesharing computer networks.

Recently, the development and extensive marketing of microcomputers has reduced the cost of owning and operating computer systems. The ready availability of microcomputer hardware through major distributors, the intense marketing effort of computer manufacturers, and increased capabilities of the equipment suggest that microcomputers are an available technology for assimilation into special education practices.

Special education's involvement with classroom application of microcomputer is likely to increase even more rapidly than general education's during the next few years. The reason for this is that the pedagogical element that distinguishes special education from other educations is its record of *openness to technical innovation* and its assimilation of technology into real and continuing practices for the benefit of children with special needs. Talking calculators, variable speed tape recorders, the Optacon, computer based materials retrieval systems, and paperless braille machines are just a partial listing of special educators' use of technology. Special educators have long recognized that technology can be used to maximize the development of handicapped individuals or to help overcome disabilities.

[1] Requests for reprints should be sent to the first author.

Evidence of special education's accelerating involvement with computers is found in the "media" proposals submitted to the Bureau of Education for the Handicapped. Andereck (Note 1) disclosed that while in 1977 and 1978 less than five percent of the field initiated proposals involved computer applications, this figure increased to 13 percent in 1979, with most concerned with microcomputers.

WHAT IS A MICROCOMPUTER?

Microcomputers, also known as home computers, personal computers, and "stand alone" computer systems are typewriter sized machines capable of reading and executing various commands such as "LIST" or storing instructions in memory for repeated subsequent executions. "Micros" are computers that have been reduced in size but still possess the capabilities of room size units of a decade ago.

Despite differences among the systems supplied by the several microcomputer manufacturers, a microcomputer system usually includes:

1. a microprocessor similar to the central processing unit in a large scale computer;
2. a typewriter-like keyboard for entering instructions, data, or for responding to machine queries;
3. a cathode ray tube (CRT) of the T.V. type for displays;and
4. a cassette tape and tape player for storing and loading programs.

In addition to these components a variety of secondary or peripheral equipment that expands the capabilities of the microprocessor can be added to a basic system as user needs arise. Peripherals are especially valuable for making input and output arrangements compatible with the needs of the handicapped. Audio peripherals that permit the microcomputer to synthesize speech or access prerecorded messages from a tape can be used by handicapped individuals who are nonverbal. Peripherals that allow the machine to respond to voice commands can be used by the seriously physically handicapped. The learning disabled or the mentally retarded can use light pens to make pointing responses to multiple choice questions displayed on the screen or to trace figures and line drawings for instant display on the video screen. Touch activated keyboards, kneeswitches, and "joy sticks" enable severely physical handicapped persons to communicate with the machines. Printers provide "hard copy" of information displayed on the screen. A special record-like device called a "floppy disk" and a disk drive can also be added to increase the memory capacity of the machine for more efficient storage and access of information or programs. A device called a "Modem" allows one microcomputer to communicate with another over telephone lines and also allows for the easy transfer of programs. These are a few of the most common periphierals that are available.

Cost

For classroom applications, microcomputers possess the advantage of requiring a relatively small capital investment. Microcomputers can be purchased for between $800 and $7500.

LIMITATIONS OF MICROCOMPUTERS

A report from the Minnesota Educational Computer Consortium (1978) indicated several weaknesses of microcomputer systems, including the following: (1) limited ability to store and move large data sets, (2) limited ability to perform repetitive calculations, (3) limited availability of high level languages for authoring computer assisted instruction courseware, and (4) limited availability of high quality educational programs. The last two limitations are the most serious and fortunately are being addressed by technical experts and users. Three current examples of high level languages for authoring computer assisted instruction courseware are TUTOR, PILOT, and ASSIST. Presently,

only PILOT has a microcomputer version but attempts are being made to modify existing programs and develop new authoring languages for microcomputer usage. The availability of an "author" language such as PILOT allows classroom teachers, with no technical or programming skills, to learn to write simple courseware after about three hours of instruction.

Educators who are interested in exploring the use of microcomputers in classroom settings should be aware of software and courseware development costs. As hardware prices decline, the software development or programming costs become a larger proportion of the total application cost. Software development is labor intensive. And purchasers of low cost systems, lacking either the skills or time to do their own programming, may find themselves the proud owners of equipment that remains idle for lack of sufficient software.

Special educators who are considering using microcomputers for classroom instruction should also be aware of some potential safety hazards: x-ray emission and cathode ray tube flicker. Because most microcomputers use cathode ray tube displays with high voltage requirements, there is an associated x-ray emission. Also, the user is seated closer to the cathode ray tube than is typical for television viewing and eye fatigue may be induced by the flicker of the screen. Apparently, the limits of safe exposure to these effects remain indeterminate at this time (Nisen, 1979, p. 5).

SPECIAL EDUCATION APPLICATIONS

Computer Assisted Instruction

Although relatively few in number, some studies have examined the effects of computer assisted instruction on cognitive and affective variables for students with special needs. Edwards, Norton, Taylor, Weiss, and Van Dusseldorp (1975) concluded that computer assisted instruction seems to be more effective with low ability than with middle or upper ability students. Suppes and Morningstar (1977) and Martin (Note 4) reported similar results in their studies.

Cartwright and Derevensky (1976) demonstrated a positive effect of computer assisted instruction on student motivation, while Crandall and Mantano (Note 2) reported that disadvantaged Mexican-American students exhibited positive changes in attitude and motivation when CAI was used. In another study relating to affective objectives, Tolor (Note 5) reported that students exhibited increased internal locus of control after an eight-week computer tutorial. As an approach to some of the problems faced by minority handicapped students, CAI was used to provide private, non-threatening and reinforcing interactions with the student (Suppes & Morningstar, 1977).

The most recent, comprehensive review of the effectiveness of computer-assisted instruction in the secondary schools was reported by Thomas (1979). Although special education applications were underrepresented, a few were noted: urban disadvantaged learners with remedial needs, accessing occupational information, CAI for the Deaf and Hearing Impaired, and the teaching of reading. A major effort in reading courseware development for secondary students with learning disabilities was recently completed by Control Data Corporation and on Minnesota State Department of Education with support from a Title VI-C, P.L. 91-230 grant. This computer-based reading and language arts program is the most sophisticated instructional system now available for the handicapped and is designed around the PLATO timesharing system (Joiner, Note 3). No microcomputer version of this program is available yet, however.

Assessment and Child Find

In a report to Congress, BEH noted extreme variations among states in the proportions of school-age children that had been identified as handicapped. Critics of BEH have alluded to exaggerated estimates of the prevalence of handicapping condition among American children (O'Gara, 1979). But it is also likely that poor screening instruments fail to detect some handicapping condition, early.

Paper and pencil tests of eye-hand coordination are among the most widely used in screening, for example, the *Draw-A-Man Test* (Goodenough and Harris, 1963). Although the interrater reliability of that particular test is considered adequate for gross screening, the results can easily be distorted by uncontrolled situational factors such as interest in the task, conditions under which the test is given, rapport with the examiner and perceived reinforcers (Joiner, 1978). The conversion of eye-hand coordination screening tests to microcomputer format would be a relatively easy and inexpensive process that would be likely to result in better control over threats to test reliability and validity. The microcomputer could present a series of graphic displays and the child would manipulate a potentiometer using a joystick, a series of buttons, or rotating knobs. The "cineopsychometric" test program could be branched so that the particular graphics format or the speed of the test would change according to the child's performance. A final analysis of the student's skill level would be generated by the program upon student completion.

Because of the interactive and branching capabilities of the microcomputer, diagnostic testing can be improved. For example, using the technique of dimension control, the program can be written to systematically branch through questions or problems of predetermined dimensions based upon the student's responses. Student responses can be stored and then printed or retrieved by the teacher for subsequent diagnostics. A second testing option would be solely for the purpose of pretesting and giving students feedback on his/her performance and then giving the teacher summaries of the student's progress. If criterion referenced tests are used, the machine can immediately output the page numbers in the text that the student needs to address or the materials that are needed to remediate the problem.

Enhancing Normalization

Normalization of the treatment of the handicapped includes establishing communication between handicapped and non-handicapped persons in a community. Placing a multiply handicapped person in a community residential facility or a small group home rather than an institution does not necessarily lead to removal of the sense of isolation that many handicapped persons feel.

Contrary to the stereotype of the computer as "dehumanizing", wider availability of microcomputers may help bring isolated people into closer contact with other members of the community. One notable application of the computer as a day or night, person-to-person communication device was developed by the New Jersey Institute of Technology and reported in *American Education* (1979). A communication link, through computer conferencing, was established between "alert but shut-in women" in a nursing home and children at a cerebral palsy center. Microcomputers can be interfaced by telephone in the same way. In this application, the computer provided a means of personal communiction and emotional support. To enhance verbal communication skills, computers have already been used in a microcounseling model (Hamm, 1975).

According to Jung (N.D.) a microcomputer properly interfaced with an assortment of input and output devices can become the "eyes" for those who are visually impaired, and the "voice" for those who cannot talk. Jung reported three case studies of severely physically handicapped individuals who had successfully used microcomputers as a communication prosthesis with especially adapted equipment. In a BEH funded project in North Carolina, microcomputers are being adapted for use by visually impaired community college students to "read" scientific instruments in a science laboratory (Andereck, Note 1).

Homebound and Hospital Teaching

Most homebound or hospital education programs provide only a few hours of instruction per week for each learner. These service alternatives are expensive and will continue to increase in costs as transportation rates escalate due to fuel costs. Microcompters can be used to augment some of

these person-to-person contacts in two ways. One way is through the machine itself and the self-instructional programs that are available; another is through telephone hookup. The teacher can interact with the student by way of a second machine, displaying video information and processing responses.

SUMMARY AND CONCLUSIONS

Microcomputers, because of their expanding capabilities, extensive marketing, and declining costs are becoming a new available technology for special education. Given the discipline's history of openness to using technologies in the classroom, we anticipate that microcomputers will become important tools for special education teachers.

Versatility is a key advantage of the microcomputer to special educators. A variety of available peripheral equipment expands the capability of the microprocessor and can be added to a basic system as the need arises. Peripheral equipment is especially valuable for making input and output adaptations that are compatible with the needs of the handicapped: voice commands, lightpens, touch panels, potentiometers, and keyboards.

The availability of microcomputer technology suggests that we should begin to include information about them in teacher education and inservice programs. Special educators need to be informed that while the technology is promising, it is no panacea. The limited availability of easy-to-use computer assisted instruction languages and high quality educational software appropriate for use with special students are two serious limitations. If software and courseware development is to occur at the local district level, it will be expensive because these activities are labor intensive.

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A Microcomputer/Videodisc CAI System For The Moderately Mentally Retarded

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ABSTRACT

A study is currently being conducted at Utah State University's Exceptional Child Center to develop, and investigate the effectiveness of, a computer assisted instruction system designed for use with non-readers. The system will utilize the recently developed random access videodisc interfaced with a microcomputer. Software is being developed to utilize these new technological hardware advances. If the evaluation shows the system to be cost and instructionally effective it will provide a means of providing self-paced, individualized instruction to mentally handicapped non-readers without the direct attendance of the teacher and will provide an automated means of collecting, analyzing and reporting extensive student data.

The random-access videodisc player is a recent technological advance that could have a substantial impact in Special Education. The videodisc player interfaced with a microcomputer has the potential to provide computer assisted instruction (CAI) to mentally handicapped non-readers. This possibility exists because of the random-access capabilities of the videodisc and the interaction capabilities of the microcomputer. Researchers at Utah State University's Exceptional Child Center are currently investigating this potential. A research project is being conducted to develop a microcomputer/videodisc computer assisted instruction (CAI) system to provide individualized instruction to the moderately mentally handicapped learner. If the system proves both cost and instructionally effective it will benefit special education teachers and mentally handicapped learners by providing: (1) a means of delivering individualized self-paced instruction to the learner without the direct attendance of the teacher, and (2) a means for collecting, analyzing and reporting extensive data concerned with the progress of the learner. These attributes should free the teacher to attend to other pressing classroom needs.

Many special educators have long felt that the computer holds a special promise for special education because of its capacity for individualized instruction. This promise has not been fulfilled because of the limitations of audio-visual hardware and the high cost of computers. Most of the CAI projects reviewed by the authors listed the limitations of existing hardware as the major problem in providing effective CAI to handicapped learners.

Limitations of Traditional CAI

The majority of CAI programs for the handicapped have been designed for the mildly mentally retarded who have at least the rudiments of reading and writing skills. Effective demonstrations have included coins summation (Knutson & Prochow, 1970), vocabulary (Nelon, 1972), reading, mathematics, spelling, and verbal skills (Leonard, 1970; Rosenkranz, 1974; St. Aubin, 1976).

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A review of the literature has revealed little emphasis on using CAI with moderately mentally retarded or with non-readers. The lack of research in this area is due to the past limitations of computer hardware. To be effective for moderately and severely mentally retarded children, CAI must provide a full range of color, graphic, and auditory capabilities along with a variety of student response mechanisms. Computer auditory capabilities have been limited, and because of the limited and costly nature of computer software generated graphics, CAI has been implemented with no or very primitive animation. Colby (1973) has stated that CAI allows a limited number of responses and that we need to "find a way to rapidly randomly-access both sounds and pictures" (p. 260). Geoffrin and Bergeron (1977), in the conclusion of their report, suggested that a larger variety of activities other than animation are needed and that these "activities must be designed to train generalization reading skills to new words and situations other than by computer animation" (p. 12).

Hirschbuhl and Seeman (1975) have reviewed recent developments in CAI and give three recommendations for expanded application of CAI. They state that CAI must provide:

1. The ability to generate, program, and edit interactions with complex real images.
2. A technique for creating and delivering cost-effective graphics and visuals that allow for interaction.
3. The capability of providing overlays on images for sequential question frames. Such questions need to be communicated by audio messages (p. 86).

Recent Technological Advances

Most of the limitations of CAI cited in the literature are related to video capacities. However, the most serious limitation with CAI for the mentally retarded has been the lack of random access audio. Considering that the majority of the moderately handicapped have little or no reading skills, random access audio is essential to a CAI system for this population. It is necessary that the CAI system have the capacity to provide instruction verbally. Random access is necessary to provide smooth and fast transitions to remediation material. The random access videodisc player is a recent technological advance that has great potential to allow the implementation and manipulation of audio and video functions. The use of the videodisc and microcomputer will enable the presentation of material in a situation where the learner is being given individual, self-paced instruction. The instructional material can be presented in small increments of difficulty and progress of students can be easily monitored.

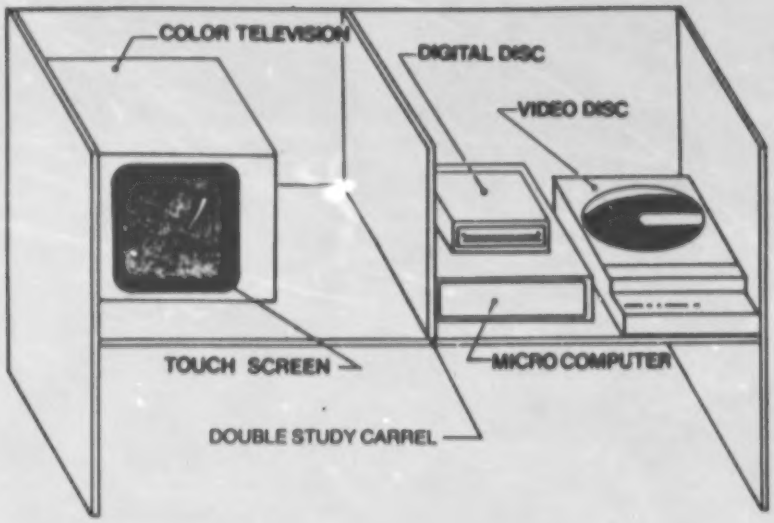
The USU Exceptional Child Center's Videodisc Project

The major goal of the project[2] at the Exceptional Child Center is to develop and field test an individualized instruction system for moderately mentally retarded, non-reading learners. The system developed by this project is referred to as the MCVD (MicroComputer VideoDisc) system. This system should alleviate many of the problems mentioned by Colby (1973) and Geoffrin & Bergeron (1977).

The hardware for the MCVD system consists of the MCA videodisc player, the Apple II microcomputer, a Sony 12 inch color television monitor, and a Carroll light interrupt touch panel. The videodisc offers a fast, economical and feasible way of storing and presenting audio/visual information. Specifically, the videodisc allows the random access of 54,000 frames of audio/visual information. The worst possible access time from frame 1 to frame 5400 is about about 5 seconds. Actual access time during the operation of MCVD program is one to two seconds because the program occupies about one-third of one side of the disc. The videodisc allows the use of both still pictures and motion pictures with or without the use of sound. The Apple II microcomputer was selected because of its portability, low cost, proven reliability and color graphics capabilities. A color monitor was chosen because of the additional flexibility provided by the availability of color. The touch panel is a light interrupt system which allows the learner to interact with the system by touching the screen (see Figure 1 for hardware configuration). The location touched on the screen is transmitted to the microcomputer which then directs an appropriate response.

[2]This project was funded on a pilot basis for one year by the Utah State University Research Office.

SYSTEM DESCRIPTION



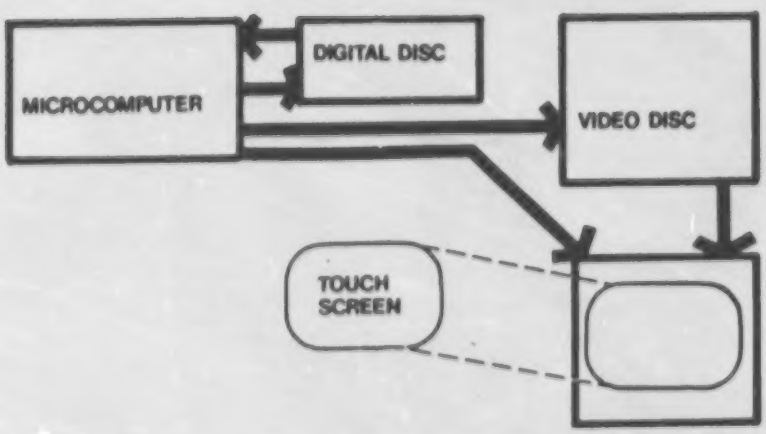


Figure 1
Hardware Configuration

The software for the MCVD consists of the instructional material and the computer programs required to present the instructional material and monitor the student's response.

The computer language used to write the computer programs that present the instructional material is a language designed specifically for CAI. This language is named PILOT and is useful because educators with little or no computer experience can write CAI courses. The MCVD system is being designed so that teachers can ultimately develop their own CAI courses or instructional modules. The use of PILOT will facilitate this teacher authoring. It has been necessary to make modifications to the PILOT language in order to control the videodisc and receive input from the touch panel. These modifications involve adding three new PILOT commands. The addition of these commands has not interfered with the programming ease of PILOT.

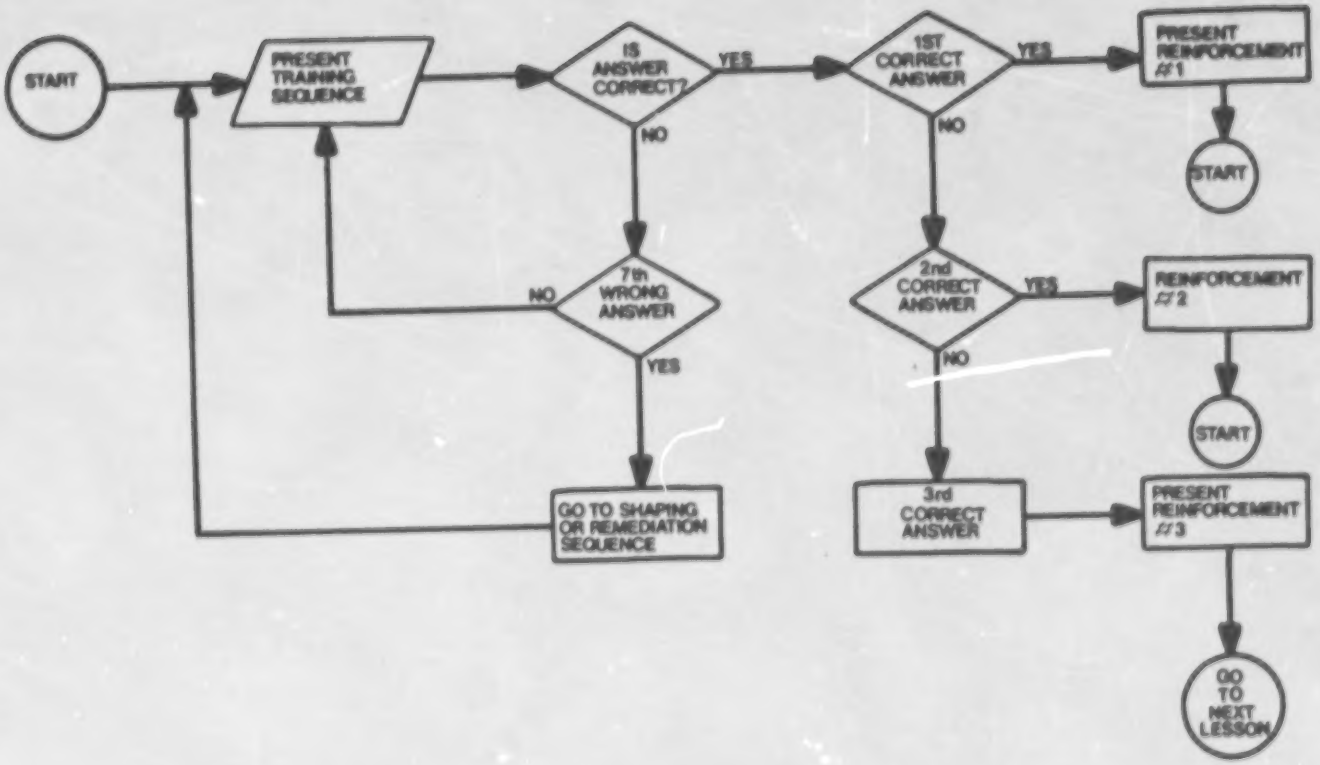
The instructional program courseware, developed for use with the MCVD system, is based on the instructional package "Matching Sizes, Shapes, and Colors", (Hofmeister, Gallery & Landeen, 1977). The Matching program is designed to teach the learner to match objects that are alike in size, color, or shape. The Matching program was selected for three reasons. First, the matching task is relevant for learning behavior of greater complexity such as language (Sherman, 1971) affect (Bijou & Baer, 1961), imitation (Gewirtz, 1971), and reading (Sidman, 1971). Second, the skill of matching-to-sample is typically taught to moderately and severely retarded learners. And third, this instructional package has been field tested and validated. The modified version of the package was kept close to its original; however, some reprogramming has been required. For example, a puppet and a model have been added to present the instruction and enhance the learners interest.

In addition to rewording some of the instructions of the original program, feedback responses were developed for correct, marginally correct, and incorrect responses by the learner. The microcomputer categorizes the response, and the puppet gives verbal feedback appropriate to the type of response. The reinforcers consist of movie film clips and filmed sequences involving verbal and auditory feedback and/or praise from the puppet.

The following briefly describes how the system interacts with the learner: The system presents an audio instruction and an associated visual image via the television monitor. The learner responds by touching the television screen. The area touched on the screen is transmitted to the microcomputer via a touch panel and the response is evaluated. If the response is correct, a signal is sent to the videodisc player by the microcomputer. This signal references a segment on the videodisc which contains an audio and visual reinforcement (a film clip). Other possible response conditions are a wrong response, a close response, and a non-response. The non-response is detected by allowing a specified period of time to respond. There are recorded segments on the disc for all possible response conditions as well as a variety of positive reinforcements varying in length and type. There are also remediation segments to which the learner can be branched when appropriate.

Parameters are set in each lesson within a program which determine: (1) the number of times the learner must respond correctly before branching to a reinforcement segment; (2) the number of times the learner can respond incorrectly before branching to a remediation segment; and (3) the number of times the learner is allowed to cycle through the same lesson without reaching criterion before the teacher is signaled and asked to intervene. A time limit is set for each session at which time the teacher is signaled to end the session. Figure 2 provides an example of the instructional sequencing used. The sequence is presented smoothly and without appreciable gaps between sections because of the random access nature of the videodisc player.

A classroom management plan and associated manual will be developed describing the use of the MCVD system as part of the classroom environment. This manual will describe how the MCVD system can be incorporated into an existing classroom and how the MCVD system and the existing classroom program can complement and supplement one another. This is an important aspect of the project, and one that has not been fully considered in many CAI applications. In many instances critics of computer assisted instruction have viewed the computer as a solution looking for a problem. Ellis (1974) has stated:



Figrue 2
Instruction Sequence

> The computer is but another vehicle to employ in helping people learn .... Rarely can one productively start in educational reform with things, whether they are books, films, or computers. One starts with a consideration of the ends of instruction, and employs things only as each of these emerges as the most efficient approach to meet these ends (p. ix).

The random access videodisc player is a new and powerful media device but, by itself, it is also one of those "things". It has the same potential drawback of being a solution looking for a problem. A management plan that emphasizes the attainment of instructional objectives will help insure that the MCVD system is an integral part of the instructional environment and not an imposition to this environment.

Videodisc Production

The production of the disc presents one of the major problems in utilizing the MCVD system for computer assisted instruction. The disc must be pressed in the MCA studios in California. Currently this is an expensive process, costing approximately $1,250 for the pressing of one side of a master disc. This expense and the time involved in pressing the disc (two to four weeks) prohibits frequent revisions to the disc. Once the disc is pressed, the developer must be satisfied with the contents. Because of this, current research and development (R & D) models are impractical in designing and validating educational materials for videodisc applications. Most existing R & D models call for several field tests and consequent revision for the materials being developed. At $1,250 per draft, the cost incurred when using a model requiring a number of drafts quickly become prohibitive.

To keep development costs for interactive videodics within practical limits, an R & D model is needed which increases the probability that the first or second draft of a package will be effective. Several systems modes have been developed which might be adapted for this R & D model. Fault Tree Analysis (Stephens, 1977) for example, is an approach which uses planning techniques to anticipate and analyze possible errors. The incorporation of this type of an approach into an R & D model would reduce the cost of developing instructional videodisc programs.

It is not within the scope of this project to develop this R & D model, although through our experience we should be able to substantially contribute to its development. In the production of the material for the disc used in this project, we attempted to reduce the need for revision by thoroughly rehearsing the program script and trying to anticipate all branching situations and associated feedback.

Other ways of reducing the costs associated with the testing of instructional materials destined for use with the videodiscs would be to present the material during early stages of development on other media systems such as the VIS-I-CON system (Fox, 1979) or the Sony Betamax with a random access attachment. The VIS-I-CON system utilizes a microprocessor to control the presentation of super 8 film and magnetic audio tape. The Betamax is a videotape player that has random access capabilities. Although both of these systems have slower access time than the videodisc (because of the serial nature of the devices), program material destined for use with the videodisc could be tested using these systems; particularly if the film and audio tape segments were kept short, thus lessening the access time.

Future Considerations

Currently under development at USU's microcomputer lab is a feature which will provide the ability to place material from the videodisc and/or the computer on the screen simultaneously. This will allow the use of computer generated graphics and text to be displayed simultaneously with the image and audio from the videodisc. Considering the excellent graphics software currently available, this will greatly enhance the flexibility of the system. Another future consideration is the videodisc's ability to store digital data. With this capability an entire program including the required computer software could be stored on videodisc. The addition of a more powerful microcomputer internal to the videodisc player and a general purpose keyboard would result in a single unit system that would be programmable and have computer graphics capabilities.

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Teaching Reading with Television: A Review

George E. Mason and
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Introduction

According to Bell (1975), at least 97% of American households had at least one television set by 1975, and the average American sixth grader watched three to six hours of television per day. Schramm, Lyle, and Parker (1961) had pointed out years earlier that a school child in the United States was likely to spend more time watching television than in any other activity except sleep and (possibly) play (depending on the definition of play). Witty (1959), in a survey of televiewing by children, stated that children preferred televiewing to almost any other activity. He found elementary children to be watching 21 hours per week and secondary children watching 12 hours weekly. Carter (1976) found that primary children chose television viewing as the free time activity least preferred but most indulged in.

The tremendous appeal of television and the amount of student time spent in viewing it has caused educators and concerned parents to issue numerous warnings as to the content of television programming and its possible negative effects. Doan (1976) warned of excessive cartoon viewing, and McLuhan (1967) pointed out that the lives of our children contained an ". . . extraordinary degree of involvement in the TV experience" (p. 99).

Some educators have seen television as a mixed blessing. Witty (1959) noted that many children maintained that television viewing helped them with their schoolwork. Consequently, he stated, "Research studies should direct attention to discovering ways to obtain greater benefits from the universal appeal of the electronic Pied Piper" (p. 20). Bruner (1966), too, has been excited about the possibilities of television. "If there were ever a medium that could work on the relationship between presentation of ideas in language and through imagery, television is it," he exclaimed (p. 56).

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McIntyre (1967) went a step further, writing, "Among the severest critics of television are many educators, but I say that teachers and school administrators should, rather than condemn the medium, try and discover how it grips the imagination and attention of children. It is a real pity that the school cannot enthrall them as much, because learning should and can be fun" (p. 59).

Teaching Reading with In-school Television

A number of attempts to teach reading through televised instruction have been made. One of these was broadcast to Baltimore (Md.) pupils in 1953 when a strike closed schools. Forty-six thousand children were presented televised lessons. According to Witty (1954) the children claimed they learned best from the televised lessons in science and the language arts. Carner (1961), evaluating closed-circuit televised reading instruction in Cortland, New York, found that supplementary reading instruction without direct feedback from the classroom to the television studio was of little value, but with feedback a significant increase in reading achievement could be effected. Carner (1962) later went on to point out that television can have a favorable effect on attitudes toward reading.

In an early study by Homme (1967), the use of TV foreshadowed the use of the computer to teach reading. He reported a phonic-word-reading project carried out in Albuquerque, New Mexico. Preschool children from two to four years of age were taught to read words using a light-sensitive cathode ray (TV) tube. Words and pictures were shown on the screen as audio directions and explanations were given. The subjects responded by pointing their light pencil at the appropriate section of the screen.

McDonald (1971) examined different methods of reinforcement of vocabulary words presented by closed-circuit instructional television to seventh and eighth graders in Phoenix. McDonald concluded that written reinforcement techniques help students make greater gains in learning vocabulary words taught via ITV.

Martin and Meltzer (1976) reported results of an experiment in which printed sentences were shown on a television screen with each syllable timed to appear exactly when it was spoken. Sentences thus appeared, syllable by syllable, in left-to-right order on the screen. Twenty-four second, third, and fourth grade children attending summer remedial classes in a parochial school watched and listened to the presentation of these sentences three times during a two-week period. The children also read other sentences, each of which was presented on the screen as a whole. Judges rated the pretest-posttest differences in oral fluency. The authors

concluded that those sentences presented with "visual rhythm" were read more fluently by the subjects.

Lamb (1976) described reading programs televised to audiences in five midwestern states from an airplane circling high above. Despite advance publicity and the availability of manuals from the Midwest Program in Airborne Television Instruction there was "... a massive vote of no confidence registered by non-subscribers ..." (p. 236). After pointing out that many teachers did not watch the programs with their classes, but instead spent the program time in the lounge, Lamb commented that "... teachers may be instructional television's most potent foe" (p. 376).

The Chicago Schools used television as a means of instruction in ghetto schools. Bretz (1969), in reviewing this program, stated that significant improvement of attitude and academic achievement resulted from the use of televised instruction.

Television may also be used as a highly effective means for teaching the partially sighted as well as other handicapped children. Genensky (1970) reported that closed circuit television can greatly heighten contrast, thereby enabling partially sighted to read almost normally. The interaction of several cameras and monitors can allow a teacher to be in continuous visual communication with handicapped pupils (Genensky *et al.*, 1974).

Instructional Television Viewed at Home

Humphrey (1967) described a televised reading program broadcast during the summer of 1966. The purpose of the program was to prevent the loss of reading skills by children who had just completed first grade. The subjects were Evansville (Ind.) children who were tested in the spring of 1966 (as first graders) and again in the fall of 1966 (as second graders). The change in their scores was compared to the change in scores of a similar group tested in the spring and fall of 1965.

The children watched the first half of an introductory program in school during the month of June. This half was intended to motivate the children to watch the 40 lessons which were to be broadcast during the summer. The second half was directed to parents, who had been notified earlier in the week that the program was to be, in part, for their benefit. This part was intended to motivate parents to be interested in the children's activity books, to take their children to the library, and to help children understand directions given by the television teacher.

The show and the activity book were both entitled *Ride the Reading Rocket*. The teacher, Miss Sandy, and her puppet, a space-creature named Rocko, taught sight words and reviewed basic skills. Each day during the eight weeks of broadcasting the teacher drew a simple picture relating to the day's lesson. The children were instructed to copy it on the attendance page of their activity books. In this way the investigators acquired an attendance record of each day's viewing audience.

During the summer the studio received 2,342 postcards from viewers. Furthermore, 518 new first grade graduates signed up in branches of the public library as "Rocket Readers." More than 1,000 visited Miss Sandy at these library branches during the eight weeks of televiewing.

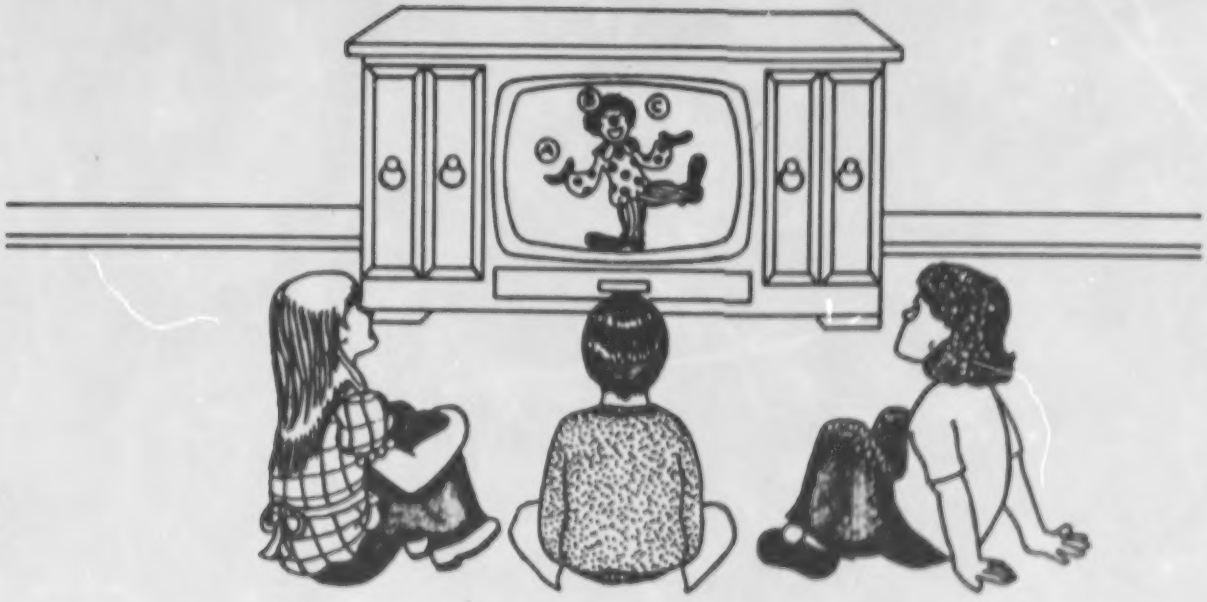
The pretest-posttest score changes for 1,906 experimental subjects were compared to those changes for the 2,051 members of the control group. While control group scores in total reading decreased from a mean of 2.02 (grade equivalent) to 1.86, the experimental group's scores decreased less, from 2.06 to 2.04.

Among the conclusions reported by Humphrey were the following:

1. The summer television program significantly increased library usage.
2. Compared to children who had no formal reading program during the summer, the children participating in the televised summer reading program made significant gains. This was especially true for boys.
3. Children whose returned activity books indicated that they had watched more than half the programs made significantly greater gains than those who watched less than half of the programs or who did not return their activity books.

In 1963, 16 half-hour programs were presented to parents in Denver, Colorado. The purpose was to help parents prepare their children for beginning reading instruction. McManus (1964) reported that parents who had viewed the broadcasts had helped their children make significant gains in sight word recognition, in letter-naming, and in simple phonics skills. The skill most emphasized was using context and the sound of the initial letter as dual cues for decoding words.

Perlish (1968a, 1970) chose groups of three- and four-year-old Philadelphia children to whom he taught pre-reading and reading skills with a half hour television show five days per week for 39 weeks. The children viewed the show at home and were given reinforcement and help by their parents as they completed their "Wordland Workshop" workbooks (Perlish, 1968b). The 70 members of the experimental group who completed the project earned significantly higher scores on the criterion reading test than those earned by the 80 members of the control group, who consistently watched



"Captain Kangaroo" during the experimental time period.

Dunn (1970) employed closed circuit television to present the alphabet, letter sounds, and basic vocabulary words to 90 children aged two through four. Parents were asked to attend the televised presentations and to help their children ten minutes per day by following a manual provided them. Dunn found that the greatest gains were made by children from lower socioeconomic classes, and that age and verbal intelligence were not related to gains made. Gains were positively related to the amount of time parents spent in follow-up activities with their children.

Three types of educational programs using television were evaluated by Bretz (1972). Aimed at elementary, college, and vocational students, the success of each program was found to depend on good program planning, directing programs to particular audiences, providing feedback to student responses, and publicizing the program before it was shown.

Television and the Computer

The merging of televised and computer-assisted instruction was accomplished by the "Tele-Catch" system (Computer-Tutor, 1976). Funded by the State of New York, this system enabled children who could not to go to school to dial a controlling computer by phone. Then they placed their telephone receivers in special holders (an acoustic coupler or modem) which had small typewriter keyboards attached. By typing out a lesson request to the computer, the children would receive cable-transmitted television lessons. More than 2,200 lessons were available. Special keys were available to call for direct voice assistance from live teachers standing by. No evaluation has been reported as yet.

Eller (1975) described the Individual Mastery Learning Instructional System, another TV-computer system. It was a Title III ESEA project implemented in four schools located in the San Francisco Bay area of California. In this project, the total audio-visual resources of participating schools were catalogued and computer-stored so that teachers could call for any listed materials by typing in their requests on a console. The orders were then filled by real-time off-air broadcasts from the ETV center of the Archdiocese of San Francisco. The reception of these broadcasts was made possible by the installation of microwave towers at the four participating schools. When real-time off-air broadcasts could not be made available, videocassette copies were made and delivered to schools by truck. (Once a videocassette was delivered to a school, it remained there as part of that school's videocassette library.) During 1973-74, 36 participating teachers requested 207 programs for use by 1,080 students.

At the conclusion of the pilot project, teachers interviewed preferred videocassette delivery to real-time off-air broadcasts because the cassettes had several advantages. First, cassettes enabled the teacher to be flexible in scheduling use. Second, cassettes could be replayed as necessary, for a class or for an individual student. Third, cassettes could be partially used.

The attitudes of the participating teachers changed radically. When the project began, only 1.9% of the teachers thought of TV as a means for individualizing instruction. However, by the end of the second year of the project, 59.9% regarded TV as "an important instrument for individualizing instruction."

In the early 1970s, Brigham Young University's Institute for Computer Uses in Education began to develop the courseware for TICCIT (Time-Shared Interactive Computer Controlled Information Television) to be developed by the Mitre Corporation (Herlin, Bance, and Hansen, 1976). The purpose was to take advantage of the informational and motivational strengths of color television by controlling its presentations with the computer and adding such computer-assisted instruction as might enhance the presentation.

Computer recordkeeping allows teachers to determine which lessons students have completed and which ones they are working on. Progress within lessons and scores on lesson posttests are also available to the teacher when he/she requests it of the TICCIT computer system.

The TICCIT Reading Program was developed by Brigham Young University at the same time as the General Education Critical Reading Program (GECRP—required of all freshmen). Both courses were begun in Winter, 1975. In Winter, 1976 the latter course was taught to ten sections of students. Many of the students used the TICCIT Reading Program as a supplement to the once-a-week class discussions of GECRP. Those students using the TICCIT program who were helped most were those who started with the lowest scores. A one-teacher pilot study indicated a ten percent advantage on evaluation test scores for students using TICCIT and generally favorable student response to the computer program.

Educational (Public) Television and Reading

Two shows directed at children have been successful at holding their audiences. Both of these are productions of the Children's Television Workshop. They are, of course, "Sesame Street" and "The Electric Company." The Children's Television Workshop has reported a number of research and evaluative activities related to these programs.

Sesame Street. Ball and Bogatz (1970) reported, in their evaluation of the first year of "Sesame Street," that there were three reasons for attempting to teach preschoolers with television. These included the fact that nearly every home in the United States has a television set, the fact that children learn from television, and the fact that existing programs were not aimed at providing education to lower-income children who were unlikely to be educated in nursery schools.

Lesser (1974) discussed the unique cues to learning that were available to the writers and producers of "Sesame Street." For example, speech balloons that appeared as a means of teaching letter names soon cued viewers that the appearance of a balloon was a signal to learn letters. Zoom-ins cued children to discriminate the features of a display that were zoomed-in on.

The goals of the "Sesame Street" program were stated in behavioral terms and an attempt was made to compare the learning of these goals for three-, four-, and five-year-old children who watched at home or in their preschool classrooms with the learning of comparable groups who did not watch. According to Ball and Bogatz, the results were conclusive. Children who watched more of the program segments earned higher scores on the posttest and gained more in scores. Three-year-old children gained more than fours, who gained more than fives. Disadvantaged children watched less and gained less than more advantaged ones. The comparison of at-home viewers with at-school viewers was unsuccessful because so few at-home viewers watched with any consistency. Rural children gained more from viewing than did the overall sample, and the gains of Spanish-speaking children were spectacular. When the overall progress of target groups was evaluated, positive effects were found for nearly every goal attempted.

Bogatz and Ball (1971) also reported the evaluation of the second year of "Sesame Street" viewing. In so doing, they replied to Sprigle (1972) who had argued that "Sesame Street" had failed to achieve success with his population of matched pairs of five-year-old children. Bogatz and Ball reaffirmed the report of the first year's showing and added that children who had viewed the programs both years performed significantly better in the goal areas that were new to the second version of the show, and in two of the three attitude areas. In this latter assessment (of attitude toward school and race) the evaluation of "Sesame Street's" second year demonstrated that television programs could deal with the affective areas relevant to school learning.

The Electric Company. Since "Sesame Street" had become a "smash hit," the Children's Television Workshop decided to produce a second series devoted to the improvement of reading. "The Electric Company" was designed to improve some of the reading skills for all first graders, as well as for those below average in reading achievement in grade two, and for those at the lowest quartile of reading achievement in grades three and four.

Formative and supportive research on attention, motivation, and certain auditory and visual display

features was contracted to the Ontario Institute for Studies in Education. Sociological aspects were investigated by the Institute for Social Research at Florida State University, and the summative evaluation was again conducted by Educational Testing Service.

The sociological findings have been impressive. According to Herriott and Liebert (1972), " 'The Electric Company' . . . recorded a remarkable advancement over previous trends in school innovativeness. If only in terms of speed and scope of penetration of elementary schools of all kinds, TEC must be considered a highly successful venture" (p. 3). These sociologists went on to report that within two months of its first showing, "The Electric Company" was being viewed in 23% of the elementary schools in the United States and that these comprised 45% of all schools which had television receivers in their classrooms and 70% of the large city schools so equipped. The number of pupils watching in school was nearly two million. The impressiveness of these figures is greater when one considers that in 1972 nearly half of the schools in the United States were not equipped to receive television broadcasts.

A second volume was completed by Liebert (1973). He reported that six percent of the nation's schools dropped "The Electric Company" in 1972-73, but that another six percent began viewing it. The biggest increase was in rural school districts, and the districts most likely to have continued for the second year were the urban ones. By late fall 1972, 41 percent of the school districts in the United States had made some use of "The Electric Company," and more than 28 percent had used it in two succeeding years. The major hindrance to the spread of the use of "The Electric Company" was lack of equipment or proximity to a participating station. Nearly half of the schools surveyed had such technical deficiencies as to make viewing the show impossible.

The evaluation of the viewing of "The Electric Company" was reported by Ball and Bogatz (1973). In each of eight experiments they found the viewing classes earned larger gain scores than non-viewing classes with which they had been paired. Both target groups (all first graders, the lower-achieving half of the second graders, and the lowest quarter of the third and fourth graders) and non-target groups gained in reading scores, with target groups making greater gains (many non-target students scored so well on the pretest that very little gain was possible) although the difference was not significant at grades three and four. No systematic effects on children's or teachers' attitudes were found, although most teachers of the experimental classrooms did favor the in-school use of the show. Reading achievement on the posttest used did not seem to be affected by the scheduling of the viewing. Classes which added time for viewing the televised lessons to their usual amount of time in reading instruction did not differ from classes for which the television viewing time replaced some of their usual reading instruction time. Target group boys gained more than girls in grades one and four, while girls outgained boys in grades two and three. Color television was slightly less effective than black and white television. When children were grouped by decile of reading achievement, no gains could be reported for the lowest decile. When classes who were encouraged to view the programs at home were compared to those not so encouraged, it was found that the actual amount of viewing differed very little and that there were no differences in reading achievement for target groups, for non-target groups, and for total classes.

Other Findings About Television and Reading

According to Peters (1974), subtitles on the picture presented to Norwegian television audiences may be responsible in part for the high literacy rate in Norway. Mason (1965) found that children had learned to read words through viewing television programs. Garry (1967) added that television was a contributor to vocabulary development in young children, but that it appeared to have a negligible effect on overall academic achievement.

According to Kinnamon (1975), a small number of commercial television stations did at one time present televised reading instruction. These included book review shows, shows designed for viewing in the classroom, and several early morning basic literacy programs. However, in 1975, only two remained on the air and both were early morning programs aired by big city stations. One was sponsored by a state education department and the other by the city school system.

Perhaps the reason for dropping reading-related shows was lack of communication between television stations and public school systems. In a scathing denunciation of television programming, Wagoner (1975) pointed out that television ". . . can teach, but, in order to do so efficiently, it must be linked with one of the teaching institutions in society" (p. 183). But few instances of such links can be found.

One of these rare linkages involved television stations in El Paso, Texas and personnel in several nursery schools. Coleman and Morton (1976) reviewed efforts to teach reading to preschool children and Spanish-speaking children through televised lessons involving crude animation. In

order to insure that the content was meaningful, early televised lessons presented cartoon characters with bubbles over their heads. Print appeared in these bubbles letter-by-letter as the speaker spoke. This animation enabled word-teaching to be in both an oral and a pictured context of whole stories.

Coleman and Morton concluded that carefully engineered spot presentations of 10 to 60 seconds on television could maximize the amount of reading ability gained by children.

Today, instead of producing new programs for viewing at home or school, increasing numbers of reading educators are recommending that teachers capitalize on children's interests in television as a means of motivating them to read more and improve their reading. Potter's (1976) excellent book reviews the history and describes the present status of the relationship between television and academic instruction, giving numerous teaching strategies for relating to and capitalizing on children's television viewing. McWhorter (1973) produced a booklet including recommendations for teaching reading as relevant to television programs.

Hamilton (1976), in a six-week experiment, found that 253 New Jersey seventh graders chose to read an average of 7.54 TV tie-ins (books related to their television viewing) and only 3.07 non-TV tie-ins (a ratio of 23 to 10). He concluded that TV tie-ins were effective in promoting an interest in reading among pupils in a low socioeconomic group and pupils with limited intelligence.

Daluohy (1976) found that classes of children characterized as low-interaction learned more from watching five television programs when programs were followed by televised discussions (of the programs) by the teacher and the class.

Solomon (1976) interviewed participants in a 1000-pupil pilot study of a television-related reading program for inner-city middle school students. He reported remarkable changes in attitude resulting from a six-step program in which children read scripts of their favorite stars' roles and asked each other for help with the words. Another success story of a similar type is reported by Dalzell (1976). Cafarella (1975) and Goldsmith (1975) have reported similar programs in which videotapes of commercial TV shows were viewed in school as motivation for related reading activities.

Summary of Teaching Reading with Television

1. Television does interest students, and viewing television programs occupies a great deal of their time.

2. Television can add to children's vocabulary, both spoken and written.

3. Televised reading instruction which is viewed in the classroom can significantly improve reading achievement for some pupils, particularly those who are below the mean in reading achievement (but not in the lowest decile).

4. Television can be an effective means for teaching the partially sighted as well as other handicapped children.

5. Televised reading instruction which is viewed at home is likely to have little measurable positive effect on reading achievement, *unless parents watch and help.*

6. Attitudes toward reading and other subject areas can be affected by television viewing.

7. More than half the schools in the United States are equipped with television receivers and a large number of those so equipped have employed these for in-school viewing of televised reading instruction.

8. The number of televised reading instruction programs aired by commercial television stations appears to be decreasing.

9. Slow learners learn best from television when televised presentations are followed by televised examples modeling how students should discuss a show. Also, televised presentations in classrooms are effective when students in the classrooms can receive immediate feedback from teachers in the television studio or from the classroom teacher.

10. Written reinforcement activities aid students in learning vocabulary words through television viewing.

11. Encouraging children during school to view certain programs at home does not appear to result in consistent home viewing of the recommended programs.

12. Using children's viewing preferences in creating interest in reading materials in the classroom, such as television scripts or "TV tie-ins," is a valid procedure which is rapidly gaining acceptance by American teachers. It appears to be particularly useful for children of low socioeconomic status and those of low intelligence.

13. Televised and computer-assisted instruction together can provide a flexible method for individualizing instruction. □

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INTERACTING: A Computer-Based Telecommunications System for Educating Severely Handicapped Preschoolers in Their Homes

Stanley R. Aeschleman and
James W. Tawney

Since 1971, public education has assumed responsibility for a new population, the severely handicapped. This responsibility was not willingly sought but was mandated by court order when parents (Pennsylvania Association for Retarded Children vs. Commonwealth of Pennsylvania, 1971) appealed to the courts to obtain free and appropriate education for their severely retarded children. This action was followed by similar suits in the majority of states initiating the *right-to-education* movement. In 1975, Congress enacted Public Law 94-142, known as the Education for All Handicapped Children Act, and stated its intent to serve all handicapped children (3-21 years of age) by 1980. Federal priorities, as described by the Bureau of Education for the Handicapped (BEH), were to identify presently unserved children and to provide educational services for the most severely handicapped children within each disability area, particularly the severely and multiply handicapped (Federal Register, 1976).

It was clear at the outset that state and local educational systems lacked the technology and resources to implement appropriate programs for these difficult-to-teach populations. To stimulate the expansion of services, the BEH initiated funding programs to train teachers, to increase support to state departments of education, to develop appropriate curriculum, to establish a network of model education programs, and to explore the use of technology in educational applications. One program, which supported five projects for a two year contract period, was established to extend applications of telecommunications technology to educate children whose physical state or geographic location made attendance in public schools virtually impossible. The Kentucky Project, described here, utilized a minicomputer control system to deliver instruction to severely developmentally retarded children from birth to six years of age living with their families in remote, sparsely populated, and geographically isolated areas.

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Dimensions of the Educational Problem

For some educators, the ideal placement for even the most severely handicapped person is a regular public school class complemented with supporting services. Other educators believe these students are better served in a self-contained public school class for the severely handicapped. Unfortunately, due to a combination of factors, neither view of the ideal will be achieved for many of the severely handicapped. This population is low incidence, perhaps 00.5% of the school age population; is heterogeneous in functional ability, including children often referred to as moderately, severely, and profoundly retarded; represents an array of multiple handicapping conditions (e.g., cerebral palsy, congenital defects, severe health problems); and is considered difficult to teach and manage since these children often manifest extreme deviations in social competency (e.g., self-injurious, stereotypic, or bizarre behavior patterns). Furthermore, because educational programs for this population must be intensive and supported by an array of therapies to be effective, resources for appropriate programs are likely to be found only in urban areas. Assuming that this population is evenly distributed geographically, it is evident that no viable intervention program will exist for a significant percentage of the population. In Kentucky, for example, there are three urban areas: Louisville, Lexington, and the northern Kentucky segment of the Cincinnati metropolitan area. Soon, if not already, all identified children will be served in these areas. Yet in the mountainous eastern Kentucky Appalachian area, in rural areas, and in small cities, there will be few viable educational programs. Further adding to the problem of service delivery is the view that early intervention, beginning at birth for children with observable biological defects, is presumed to have beneficial effects. For infants and toddlers, particularly in isolated and resource-poor areas, access to programs is even more difficult. Obviously, then, a substantial segment of the multiply handicapped population is

presently receiving no educational services, nor will they receive services from traditional sources (i.e., public schools) in the near future.

Location, Characteristics, and Socioeconomic Status of Project Participants

In Kentucky, regional mental health/mental retardation centers provide social services under the auspices of the Department for Human Resources. This system provides referrals for potential participants. An attempt was made to serve at least one child in each region. Final participants (18 in all) were, then, geographically dispersed across the state as close as 10 miles and as far as 275 miles from the project center.

The criteria for admission into the program were that the child be under six years of age, possess visual acuity in one eye, be able to move one limb without significant impairment, and not be enrolled in another educational program. Such children generally possess no functional communication skills, have limited self-help skills, have limited bowel and bladder control, score in the nontestable range on standardized intelligence tests, engage in few mutually socially reinforcing interactions with other(s), possess a wide variety of attendant handicaps, and may engage in behaviors which are harmful to themselves or which quickly bring negative attention from others.

An extensive history was collected on each family, including a ranking of socioeconomic status on a widely used measure (Hollingshead and Redlich, 1958). Residence, occupation, and education factors were weighted and placed on a five level scale. Sixteen of the nineteen families (including one replacement family) ranked in the two lowest levels. Home living environments include mountain cabins, mobile homes, farm houses, and homes in small towns. Educational levels of parents ranged from third grade to a master's degree in education. Fathers' occupations included a teacher, a business manager, and 14 laborers; three fathers were unemployed. Only three mothers were employed outside the home. Many families received, at one time or another, social service assistance. For the most part, then, these families would be considered marginally adaptive in contemporary society. Partly because of strong kinship mores and partly because their children were not of school age, they found it possible to maintain their handicapped children in the home.

Scope of the Project

To overcome the problem of geography and the lack of local resources, a prototype telecommunications system was initiated. The objective of the Kentucky Project was to develop, then test, each component of the system while bringing school, in the most general sense, into the homes of handicapped children. This work was conducted as an extension of an ongoing program of computer controlled automated instruction in an experimental preschool for severely developmentally retarded children.

Prototype signal transformation units were built by the manufacturer of the computer control system to enable telephone transmission of computer generated signals. Simple learning devices were built and placed in participants' homes, daily instructional sessions were conducted, and data were recorded. Support personnel visited homes to install and debug the system, to teach parents to use it, and to obtain other supporting services. After determining that the prototype signal transformation units worked with some degree of reliability, first generation units were built. Eighteen families were served during the second year of the project while six families were served on a third year extension of the contract.

Instrumentation

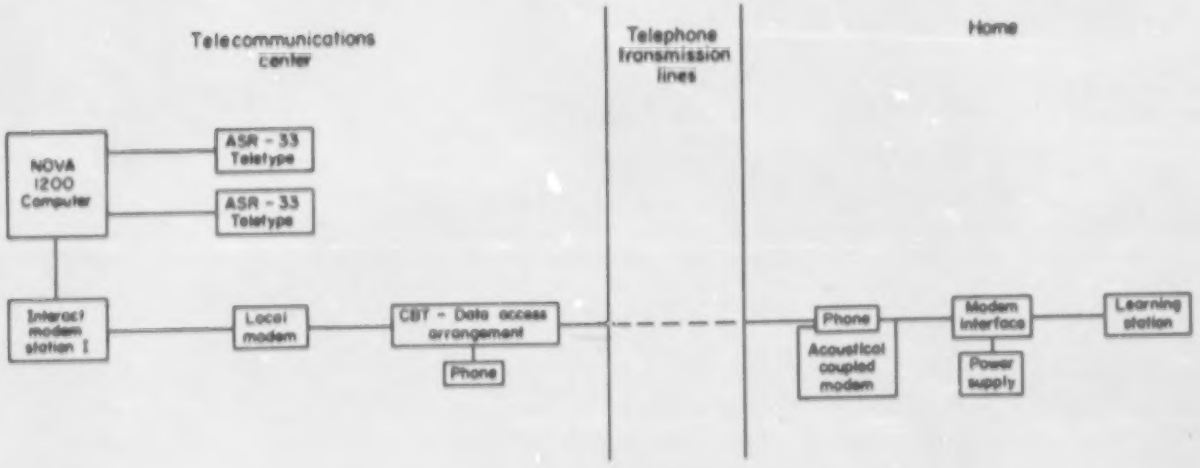
Figure 1 shows the major components of the computer-to-home transmission system. The system is described in sequential order, beginning with the central site, the Programmed Environments Project (Tawney, 1972), located at the University of Kentucky in Lexington.

The control system, known commercially as INTERACT (BRS/LVE) is comprised of the following hardware and software components: (1) a NOVA 1200 minicomputer with 12,000 words of core memory (Data General Corporation); (2) a main frame consisting of a pre-wired card file for accommodating up to 8 stations, master power supplies, system clock, probability generator, and interconnecting cable; (3) two ASR-33 model teletypewriters with paper tape punch (Teletype Corporation); (4) a high speed paper tape reader (BRS/LVE, model 531-98); and (5) the Automated Contingency Translator (ACT) language. The ACT language was developed especially for process control and data recording during behavioral studies. Child interaction with almost any type of apparatus can be monitored and controlled by this language through computer and INTERACT hardware.

Parallel-to-series, or modem interface units (BRS/LVE, model 531-12L), transformed the computer generated electronic signals into audio signals which were sent through hardware modems (Teledynamics, model 7103-LC-4) and CBT data access arrangements into telephone lines. Signals were received in homes through a telephone linked to an acoustical coupled modem (Teledynamics, model

Figure 1

Major Components of the Telecommunications System



7103–LC-3), which channelled the signals into the home placed parallel-to-series unit (BRS/LVE, model 531-12R), where they were retransformed into electronic pulses which controlled the simple teaching machines.

Instructional Programs

Instructional programs and teaching machines were designed for each child's specific needs. Staff observation and testing determined the child's behavioral deficits and from these a suitable target behavior was selected. An apparatus and instructional program were then designed to strengthen the target response. After building the apparatus, translating the instructional program into ACT language, and typing the translated program into the computer, the apparatus and program were tested at the project site. Necessary revisions were made and the apparatus was then installed in the child's home for field testing and service delivery.

Two basic types of instructional programs were developed: programs to strengthen or increase the rate of a motor response and programs to teach several visual discriminations. Figure 2 shows the kick panel and arm pull devices that were employed to strengthen motor responses and the match-to-sample (MTS) apparatus that was used to program visual discrimination tasks.

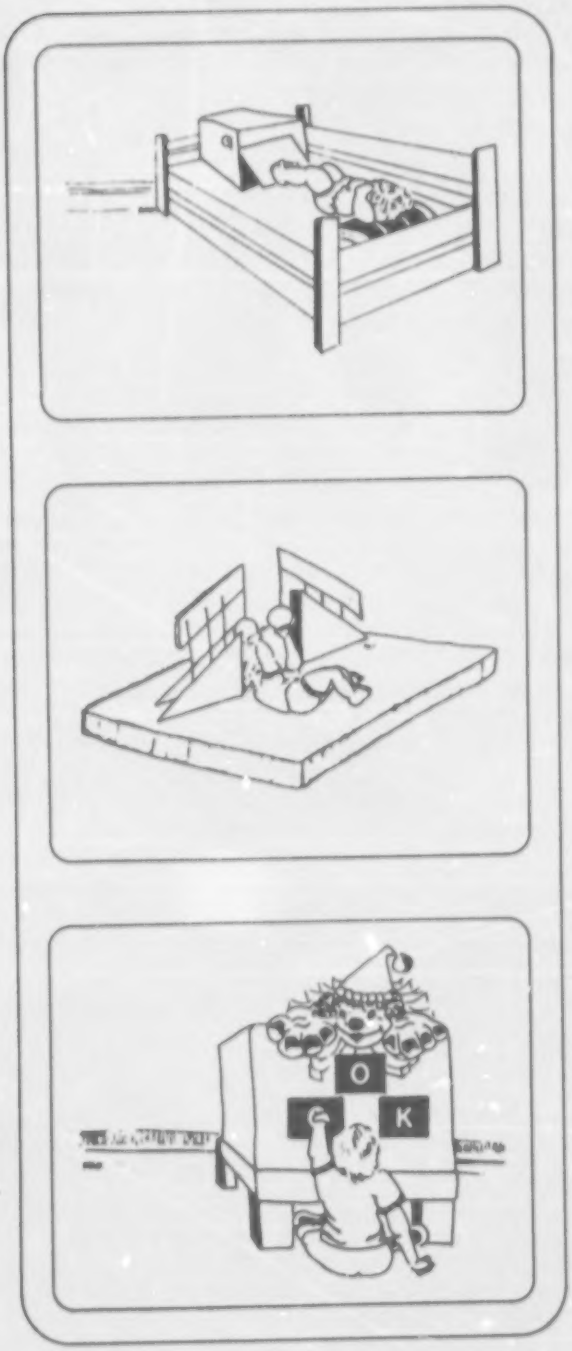
Both types of programs delivered reinforcement (e.g., tape recorded music, flashing panel lights, vibratile stimulation, chimes) contingent upon correct responses for discrimination programs or responses of sufficient force and number for motor programs. For example, one discrimination program presented a sample letter in the top window of the MTS apparatus and two choice letters in the lower windows. Responses to the choice letter that matched the sample letter produced flashing panel lights and chimes, and advanced the program to the next trial.

Daily Programming Procedures

All programs were designed to run 15 to 30 minutes, five days per week. Each day, the telecommunications operator activated the computer and fed the appropriate computer program through the high speed paper tape reader. At a predetermined time, telephone voice contact was made with the child's home and when the child was ready (e.g., in front of the MTS apparatus), data transmission was begun. Post session voice communication enabled parents to describe any unique problems and to discuss concerns and needs with project staff.

Figure 2

Illustrations of the Kick Panel, Arm Pull, and Match-to-Sample Apparatus



Child Performance Data

The diversity of programs and the variability across children within a single program make a detailed discussion of all the data impossible in this limited space. However, in general, the data indicated that some children demonstrated rather rapid skill acquisition on visual discrimination programs. On the motor programs, the majority of children showed a consistent rate of responding with no dramatic acceleration or deceleration over time. In a few instances, children failed to learn the task despite several program modifications.

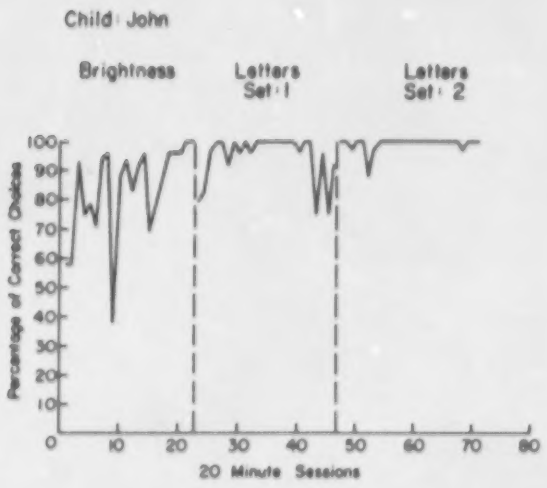
Figure 3 shows the performance of John (fictitious name) on a series of visual discrimination tasks. Similar performance histories were compiled for all children. This example, however, represents individual performance and is not considered representative of any other participant. With the exception of sharp reductions in performance on sessions 9 and 15, the data reveal a gradual increase in correct choices across sessions during the brightness matching program. This task required the child to touch the bottom window of the MTS apparatus that was the same brightness as the sample window. On session 23, a letter matching program was introduced. Letter matching programs presented a sample and two choice letters and required a response to the choice letter that matched the sample. To facilitate acquisition, these programs employed a fading technique that gradually increased the intensity of the odd letter. The introduction of the letter matching program resulted in an initial performance decrement followed by an increase to 90% or higher correct responding. For unknown reasons, there was considerable variability in John's performance on the last four sessions of the set 1 letter matching program. However, with the presentation of the new letter set, correct responding returned to the previous high performance level.

Discussion

This technology development effort demonstrated that (a) it is possible to conduct interactive automated instruction from a central site to homes geographically dispersed across the state, (b) interactive signal transmission could be accomplished reliably in most locales, (c) parents would monitor instruction and work cooperatively with project staff, (d) severely handicapped children will engage an automated apparatus, and (e) some children acquired complex discriminations on increasingly difficult preacademic tasks. These may seem to be small accomplishments when compared to the sophistication of space technology. Yet, simple systems, when fully developed, may provide educational alternatives where none presently exist.

Figure 3

Percentage of Correct Choices for John on a Series of Match-to-Sample Programs



These modest accomplishments are small, too, when compared to the potential technology applications which emerged through the course of the project. Tawney (1977) outlined a blueprint for a model coordinated service delivery agency which is heavily reliant upon computer and telecommunication technology. The model was designed for that point in the future when severely handicapped persons receive instruction from birth and, as needed, at intervals throughout their life spans. Recognizing (Hobbs, 1975) that new delivery systems may be required to support families and children to maintain a home and community placement and acknowledging that present systems deliver fragmented and ineffective services, a supra-agency was proposed to provide, coordinate, and monitor services. These activities are interrelated, each stimulating the use of others.

Provision of Services

The agency will provide automated and non-automated instruction from birth and, as necessary, through and beyond the traditional school years. While hardware technology now exists to provide instruction, it should be noted that infant curriculum development lags perhaps as much as 10 years behind state-of-the-art computer systems.

Automated instruction will be supplemented, as was done on the Kentucky Project, with liaison staff intervention with parents and children. A comprehensive curriculum will be provided, particularly in nonautomated instruction areas such as language, self-help, and social skill development. Parents will be taught to teach their children and to prevent the development of repertoires of self-injurious behaviors. Daily telephone consultation from the project site will enable staff, through conversations with parents and from data analysis, to make needed changes in programs. This information will make home visits more efficient, since the continuous data systems will provide much more precise information to liaison staff. Observations during these visits will identify family needs for medical, public health, or other social services. The data from daily automated instruction, from parents, and from liaison records will form the basis for an extensive performance data bank which will create the potential for long-term longitudinal studies.

Coordinated Service Delivery

A supra-agency will have the responsibility for maintaining records of all critical family interventions. For the severely impaired infant, these are likely to be medical. Parents may need assistance to apply for supplemental financial assistance or various types of welfare benefits. In some cases, public health support may be needed to assist and train parents to provide a more hygienic physical environment or to prepare special diets. When these activities are coordinated by a single agency, a higher quality of intervention should prevail at sufficiently lower costs to offset the additional recordkeeping and data management expenses.

Monitoring Service Delivery

When all data records are maintained by a central agency and supplemented with periodic home visits, it should be possible to monitor the effectiveness of specific interventions as well as the agency's performance in delivering the intervention. When data from all interventions can be retrieved from a central source, it will be possible to identify correlated changes in the environment. For example, it may be possible to document that a three month public health intervention designed to create a more healthful and robust environment for a child with a fragile physiological state is correlated with a decrease in minor physical problems and an increase in the quantity and quality of academic performance. The long-term data bank will create the potential for testing the limits of academic performance and provide some indication of the effects of continuous, birth onward intervention, data which does not exist today.

Other Research Possibilities

In addition to the monitoring functions which have been described, long-term intervention will create many opportunities for research and data collection which currently are not feasible. Infant learning research is one of these areas. Presently, although research is abundant, laboratory studies suffer from difficulty in obtaining subjects and maintaining them in a constant attentional state. Typically, studies are short-term and the stability of the response obtained is often questionable. In its present form, the telecommunications system can be used to conduct experiments in the natural environment during times of day when the infant is most alert.

These projected uses of technology are far removed from the readiness of society to implement them and are not likely to be utilized unless there are major reforms in public education and social service systems. The litigation and legislation which stimulated the development of the funding program which supported this project may be sufficiently powerful to initiate major reforms for the education of the severely handicapped.

Summary

Litigation and legislation have forced public education to serve the most severely handicapped. The difficulties in providing appropriate programs for these children have stimulated the development of nontraditional alternatives to classroom instruction and may, in time, precipitate broader educational reforms. The prototype computer-generated, telephonic transmission system developed at the University of Kentucky has been described. Potential uses in yet to be developed systems have been suggested. Whether public education can be encouraged to develop and support future-oriented systems is, of course, unknown. Past experience with computer-assisted instruction would not predict a favorable climate for such support. However, computers soon will become common household items. Perhaps widespread social acceptance of technology will encourage public education to reconsider its typical reactionary stance and encourage the development of simple systems which may solve complex problems. □

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Attachment D

Additional References on the Use of the Telephone

ED187053 EC124318
Creative Approaches to Compliance with P.L. 94-142 for H/H Programs: Under the Law, Who Is to Be Served and by Whom?
Grandstaff, Carole L.
Apr 1980 19p.; Paper presented at the Annual International Convention of The Council for Exceptional Children (58th, Philadelphia, PA, April, 1980, Session T-63). Best copy available.
EDRS Price - MF01/PC01 Plus Postage.
Language: English
Document Type: REVIEW LITERATURE (070); CONFERENCE PAPER (150)
Geographic Source: U.S.; Florida
Journal Announcement: RIEOCT80
The rights of hospital/homebound children under P.L. 94-142 (the Education for All Handicapped Children Act) are considered, and a model in which service is delivered through a full-time instructor whose sole job responsibility is teaching students in homes and hospitals during school hours is seen to be most favorable. Other delivery alternatives considered are the use of part-time teachers or hourly employees, the combination of full- and part-time teachers, the after school teacher who is contracted by the district on an hourly basis to provide instruction after the normal school day is completed, the "School to Home System" which consists of a hookup between a classroom and the student's home using the telephone, and the teleclass in which a telephone conference enables the teacher to reach several students at one time in a teaching situation similar to that in a classroom. Advantages and disadvantages of each model are pointed out. (SBH)
Descriptors: *Compliance (Legal); *Delivery Systems; *Homebound; Home Instruction; *Hospitalized Children; *Models; Nontraditional Education
Identifiers: *Education for All Handicapped Children Act

ED182543 CE024135
Evaluation of a Community College Occupational Education Project for the Homebound Handicapped. Special Interest Paper. An Occasional Publication for Selected Audiences, No. 17.
Abramson, Theodore
City Univ. of New York, N.Y. Center for Advanced Study in Education.; City Univ. of New York, N.Y. Inst. for Research and Development in Occupational Education.; Massachusetts Univ., Boston. Center for Social and Evaluation Research.
Dec 1978 16p.
EDRS Price - MF01/PC01 Plus Postage.
Language: English
Document Type: EVALUATIVE REPORT (142); POSITION PAPER (120)
Geographic Source: U.S.; New York
Journal Announcement: RIEJUL80
An evaluation was conducted of business education programs for the homebound handicapped students at Queensborough Community College of the City University of New York. Classrooms that career courses were scheduled to meet in were equipped with auxiliary telephone lines and conference telephone units; and specific course-related equipment was placed in students' homes for the duration of their courses. Students in the program were counseled periodically to determine possible problems or obstacles which needed to be remedied. Homebound students were provided with a course outline prior to the first class session and were able to anticipate and prepare for class dicusssions and assignments. Via their portable conference telephone, homebound students could actually participate in class discussions, answer questions, and respond to in-class students. Examinations were administered on an individual basis in the homebound handicapped student's home. During the fall of 1977, thirteen faculty members instructed homebound students in a total of eleven courses. In the spring of 1978, homebound students had the opportunity to participate as class members in ten courses with twelve faculty participating. On the basis of the data obtained through interviews with homebound students and surveys of facility and peers, the program was perceived as being successful by all participants. The final grades of students attested to their ability to perform in this setting. (BM)
Descriptors: *Business; Community Colleges; Education; *Handicapped Students; Homebound; *Home Instruction; Participant Satisfaction; Postsecondary Education; Program Effectiveness; Program Evaluation; Telephone Communications Systems
Identifiers: Queensborough Community College (New York)

ED192817 IR008905
Melbourne Telelink: A Case Study. Report 7241.
Albertson, L. A.; Bearlin, K. S.
Australian Telecommunications Commission, Melbourne.
1977 12p.
EDRS Price - MF01/PC01 Plus Postage.
Language: English
Document Type: RESEARCH REPORT (143)
Geographic Source: Australia; Victoria
Journal Announcement: RIEFEB81
This report describes an exploratory study of Telelink, a social application of telephone conferencing which is providing group communication among housebound veterans and war widows in Melbourne, Australia. The study is based on interviews with present Telelink participants and with social workers who might use the service in the future. Included in the report are a description of Telelink, an estimate of the demand based on incidence of house confinement and costs, and conclusions. (CHC)
Descriptors: Case Studies; Costs; Foreign Countries; Group Dynamics; *Group Structure; *Homebound; Media Research; Social Isolation; *Social Sciences; *Teleconferencing; Veterans Education
Identifiers: Australia; *Telelink

Recorded Telephone Messages: A Technique for Reducing Absenteeism

Ronald G. Bittle

One of the most perplexing problems facing school administrators is student absenteeism. The extent of the problem is revealed in a recent report of the National Congress of Parents and Teachers (1976) which points out that absenteeism runs from 10 to 15 percent in a given school on a typical day. In some extreme cases the rate of absenteeism runs as high as 30 percent.

The problems generated by this high rate of absenteeism are twofold. First, and most important, the child who is frequently absent is more likely to fall behind and to fail in his school work than is the child who attends regularly. This failure to keep up makes school attendance more aversive and as a result many students drop out completely (Barlow, 1961). The results of dropping out place the individual in a position in which employment is difficult to secure, and idle youths frequently engage in delinquent behaviors. The fact that delinquency and school adjustment are related is pointed out by Barlow (1961), who noted that 61 percent of delinquents between the ages of eight and 17 were not attending school. Secondly, the problem of absenteeism relates directly to the financial solvency of the schools. Many school districts receive state aid based on daily attendance. Absenteeism is reported to cost these districts millions of dollars annually.

The extent and consequences of the problem of absenteeism are such that a solution to the problem is desperately needed. Recognizing this need, the National Congress of Parents and Teachers conducted an absenteeism survey of schools in five selected states during 1975. In this survey some of the factors contributing to absenteeism were identified and solutions suggested. For example, the survey found that children of working parents frequently do not hear the alarm clock after their parents have left for work, sleep in and miss school. The suggested solution to this problem is a PTA sponsored wake-up and pick-up program. Such solutions, while obviously well intended, would seem to suffer from the same limitations of all programs which are dependent upon volunteer help for implementation.

Since the problems of absenteeism can probably best be handled by the individuals most directly involved, namely the school administrators and parents, the most effective solution to the problem would seem to be one in which these principal parties were involved. Evidence that such involvement can play a major role in reducing absenteeism is given in a recent study by Copeland *et al.* (1972). In this study school attendance was greatly increased by frequent telephone calls from the school principal to the parents, praising the parents for having their children in school.

In this study social praise by the principal appeared to be the major factor in producing increased attendance. However, telephone calls from the principal simply requesting the children's attendance also produced a substantial increase in attendance.

The study by Copeland revealed that telephone communication between parents and a school administrator was an effective way of reducing absenteeism. A major problem with such a system, however, would seem to be the demands it places upon the principal with regard to time, since a call must be initiated to each absent child's parents. The time required to implement such a system in a regular public school could be expected to be considerably greater than that required in the Copeland study, since in that study the population was from a special summer school and fewer than 10 students were involved. It seems reasonable to assume that a system requiring individual calls to parents of from 10 to 15 percent of the average school's enrollment would be so time-consuming, regardless of who was making the calls, that it would be most difficult to implement. In spite of the possible limitation of such a system due to time constraints, the study by Copeland does provide valuable evidence of a potentially useful tool for decreasing absenteeism. The essential elements of the study were: (1) communication between the school officials and parents, and (2) the use of a common communications tool, the telephone.

In the present pilot study an attempt was made to use these two elements in such a way as to minimize the limitations of the combination.

A successful effort to increase parent-teacher communication was achieved by using a telephone answering device to inform parents of their children's school activities (Bittle, 1975). In this study parents of children in a first grade class made daily calls to obtain information about their children's

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school work. Controlled tests demonstrated that every child in the class improved in spelling ability as a direct result of the availability of the daily message. The results indicated that every parent called for the message every day. The advantages of such a system were: (1) It required a minimum of teacher time. About 10-15 minutes were required at the close of each day to compose, record and check the message. (2) Parents could obtain the information at their convenience any time, day or night. (3) The impersonal nature of the recorded message reduced the apprehensions some parents might have felt in a direct contact situation with the teacher. (4) The cost of such a system was minimal—about five cents per student per day.

In view of the advantages of such a recorded message system, it would appear that a telephone answering service system would provide an inexpensive and immediately applicable way of reducing the educational and social problem of chronic absenteeism in school.

An attempt was made to test such a system at Anna Jonesboro Community High School, in Southern Illinois. This school, with a student population of 620 students, had 37 students considered by the school principal to be chronic absentees. Each of these 37 students was assigned a coded number. The school principal then sent a letter to the parents of each child informing them that during the final six weeks of school they could check daily on their child's attendance at school by calling a special number, and obtaining a recorded message listing the coded numbers of students reported absent. The letter also pointed out to the parents the child's exact percentage of attendance for the current year as well as other information about the effects of absenteeism.

Each morning following the mailing of the letter to parents the school secretary responsible for attendance records recorded a message on a standard telephone answering device. The message listed the individual coded numbers of the students reported absent that day and thanked the parents for calling. Recording the message and checking it for accuracy and auditory quality took no more than five minutes of the secretary's time daily.

During the six weeks in which the message was available a total of 247 calls were made to obtain the information on the recorded message. Nineteen of the 37 students improved their attendance following the inclusion of their number on the telephone message. Since this was not a controlled study the possibility exists, of course, that this improved attendance was a function of some coincidental variable other than the availability of attendance information on the recorded message. However, the number of calls received indicates that the information availability was important. There was absolutely no information of an informative or entertaining nature on the daily message other than a simple listing of coded numbers of students absent. In addition, the listing was available in the closing week of school, a time when absentee rates traditionally increase, due to improving weather conditions and realization by the students, especially those who are chronically absent, that their status as students is well established by that late time in the school year. Although the conditions just mentioned seem to work against the improved attendance being coincidental, the possibility of coincidental causation by an uncontrolled variable cannot be totally discounted. However, the number of calls received was uniformly distributed throughout the six-week period, and this fact also seems to indicate that the system was at least partially the cause of the improved attendance.

Anecdotal information also added evidence to support a conclusion that the improved attendance was an effect of the system. For example, one parent who had two children in school received the letter indicating that one of his children would be included in the listing. This parent subsequently called the school office and requested that his other child be assigned a number even though this

child's record of attendance did not indicate such a need.

The problem of absenteeism in high school is considerably different from that at the elementary level. Many high school students absent themselves from school without their parents knowing of the absence. School requirements of parent certification of the excuse for absence are easily met by students, who simply complete excuses and sign their parents' names. Where absentee rates are high the administrative efforts involved in checking the authenticity of such forms would be considerably burdensome, if not administratively impossible.

A system of keeping parents informed of their children's attendance at school is essential if a reduction in absenteeism is to be expected. There is no reason why parents should not be responsible for their children's attendance at school. In fact, many states have statutes which provide for the imposition of fines on parents whose children aren't in school regularly. Unfortunately, these laws are not enforced with sufficient vigor to affect the rising absentee rates. School officials, however, will probably continue to be held responsible for the absenteeism problem until they take positive steps to correct it. An administratively feasible, inexpensive system of keeping parents informed of a childs' attendance record, such as the one used in the present study, would seem to be a step in the right direction. Most parents are genuinely concerned about their children's educational progress and will assist as best they can if provided with the necessary feedback. A daily recorded message available to informed parents would seem to be one way of placing the responsibility for children's attendance in school back with the parents, where it belongs. □

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Appreciation is extended to Beverly Edmonds, Darrell Sauerbrunn, John Lipe and Dorothy Hileman for assisting with this project; also the Board of Education, School District 81, Union County, Illinois for permitting the study to be conducted.

Uses for the Conference Telephone in Classroom Instruction

Richard M. Goldman

Those of us involved in the instructional phase of higher education are often asked by our students:

> "I've just read an article by Dr. 'X'. Have his ideas changed from this 1967 article?"

My response is similar to the rhetorical question of most instructors:

> "Why don't you try to find his 1971 or 1975 or . . . article?"

As I analyze my above response, I quickly realize that even the most current article may have been written a year or more prior to publication (e.g., the time lag between submission of the article and the publication); the data for the article may have been from a study completed two or more years before the date printed on the journal. Nelson (1972a,b) documents this time lag problem in his studies which examine the amount of time between the presentation of papers at major conferences and their eventual publication in the journals. The problem is clear—how do university instructors enable their students to remain current on the major issues in their specializations?

I have begun to utilize technology that enables my students to obtain the most current ideas from the prominent experts in education. The Conference Telephone (CT) allows large groups of students to interact directly with a selected "expert." The expert speaks to the class from his home or office on his regular telephone. The CT in the classroom amplifies the expert's voice so that it is easily heard in a large classroom. Students are able to question the expert regarding the specifics of his past and current research. A second direction of the students' questions focuses on the expert giving the students feedback/suggestions on their research.

Uses of the Conference Telephone

I have used the conference telephone with four university courses. The students' responsibilities for one course, Application of Theoretical Concepts in Early Education, include an in-depth study of the writings of numerous persons who have had a major impact on early education. The students share their new knowledge with one another and select the expert(s) with whom they would want to interact. The students in this course decided to contact the psychologist J. McVicker Hunt since his research has had a major impact on early learning and compensatory education. The subgroup of students who became most familiar with Hunt shared their information with the other members of the class. The entire group generated a list of questions for the conversation with Hunt.

The conversation via the CT has reinforcing qualities for both the students and the experts. The students are excited by having a direct contact with a person who is a giant in their field, and in the case of Hunt, has had a dramatic impact on early education. Prior to my first experience with the CT, I predicted that the reinforcement from the students to the expert would be difficult due to the lack of non-verbal feedback. This lack of non-verbal feedback leads to an occasional "Am I clear?" or "Do you understand me?" from the expert. It seems that the reinforcement for the expert comes from the awareness that students in a distant university are aware of and are able to ask critical questions about his research.

My second experience with the CT was in the course Resources in Early Childhood Education. We contacted one of the leading experts on resources and alternatives, Mario Fantini. The processes used for the preparation with Hunt were applicable for the contact with Fantini: extensive reading of Fantini's publications by a sub-group of students; the sharing of the information by the sub-group to the entire class; the generation of questions/issues by the entire class for the telephone conversation. During a recent quarter, my students in a course titled Home Environment Learning Potential have contacted experts in two of the most well-known parent-child projects—the University of Florida Parent Follow Through Model and the Verbal Interaction Project in Freeport, New York.

An unplanned outcome of these conversations was an awareness for those students currently involved with parents that their programs compare well with nationally known programs (and in a few instances the students' programs had components that would improve the programs of the experts!).

The CT can be used with local "experts" as well as the national experts described above. In an earlier issue of *Educational Technology* (Goldman, 1975), I summarized a design for a graduate course based on simulation. The students' major task

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consisted of the writing of a research proposal that was submitted to a simulated Foundation. For this experience, I asked a colleague to play the role of the director of the Foundation. Since this colleague would be familiar to the students, I asked him to remain in his office and to communicate with the students via the CT. He criticized each proposal. The tension in the classroom was similar to the feelings those of us have had as we receive feedback from real foundations and agencies.

Advantages of the Conference Telephone

Many of the advantages of the CT were described above. In summary, they include:

1. The students experience a direct involvement with experts.
2. The students become aware that experts do not have instant success with their research projects. The experts must go through the same processes as the students—questioning, floundering, obtaining partial success.
3. The students have a specific goal for their reading/research—preparation for the contact with the expert.

Other advantages of the CT, not discussed above, include:

1. The cost factor. Inviting the experts to the campus would cost hundreds, and in some cases, one thousand dollars or more. In most cases, the cost of the one hour telephone conversation is less than the cost of renting a movie produced by the expert (if one exists). With the permission of the expert, the telephone conversation is taped for use with other classes.
2. The Hawthorne Effect (or novelty). None of my students previously had experienced contacting an expert in education via the CT. The Hawthorne Effect caused by the use of new technology increased the students' motivation to study the topics in depth. □

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Attachment E

Additional References on the Use of Packaged Programs and Instructional Modules

ED158081 08 CE017559
Multiple Learning Strategies Project. Graphics. EMI.
Steinberg, Alan; And Others
Ingham Intermediate School District, Mason, Mich. Capital Area Career Center.
Jan 1978 121p.; For related documents see CE 017 554-583
Sponsoring Agency: Bureau of Occupational and Adult Education (DHEW/OE), Washington, D.C.
Bureau No.: 498AH60038
Grant No.: G007603808
EDRS Price - MF01/PC05 Plus Postage.
Language: English
Document Type: CLASSROOM MATERIAL (050)
Geographic Source: U.S.; Michigan
Journal Announcement: RIEJAN79
This instructional package, designed for educable mentally impaired students, focuses on the vocational area of graphics. Contained in this document are nine learning modules organized into a finishing and bindery unit. Maintenance of a Challenge power cutter, operation of a hand electric stapler, and packaging with kraft paper are examples of module topics. Each module includes these elements: a performance objective page which tells the student what will be learned, what materials are needed, and what the student must do in the modules; and job steps pages written in a read (cognitive information), look (graphic illustrations of the task), do (student performs task) and check (student is evaluated by teacher) format. (This document is one of three sets of learning modules on graphics. The other two sets are written in formats designed for regular and low reader vocational students and for visually impaired students. The modules are part of a total set of over 1,300 written for different student populations. Building maintenance, dietetic assistant, small engine repair, and medical assistant are the other vocational fields covered. (JH)
Descriptors: *Graphic Arts; *Learning Activities; Learning Modules; *Mild Mental Retardation; *Special Education; *Vocational Education; Young Adults

ED158085 08 CE017563
Multiple Learning Strategies Project. Building Maintenance & Engineering. Educable Mentally Impaired. Vol. 1.
Smith, Dwight; And Others
Ingham Intermediate School District, Mason, Mich. Capital Area Career Center.
6 Dec 1976 379p.; For related documents see CE 017 554-583
Sponsoring Agency: Bureau of Occupational and Adult Education (DHEW/OE), Washington, D.C.
Bureau No.: 498AH60038
Grant No.: G007603808
EDRS Price - MF01/PC16 Plus Postage.
Language: English
Document Type: CLASSROOM MATERIAL (050)
Geographic Source: U.S.; Michigan
Journal Announcement: RIEJAN79
This instructional package is one of three designed for educable mentally impaired students in the vocational area of building maintenance and engineering. The thirty learning modules are organized into two units: floor care and general maintenance tasks. Each module includes these elements: a performance objective page which tells the student what will be learned, what materials are needed, and what the student must do in the module; and a job step page written in a read (cognitive information), look (graphic illustrations), do (instructions), and check (student is evaluated by teacher) format. (This document and related documents CE 017 564 and CE 017 565 are one of four sets of learning modules on building maintenance and engineering. The other sets are written in formats designed for regular vocational, visually impaired, and low reader students. The modules are part of a total set of over 1,300 written for different student populations. Graphics, dietetic assistant, small engine repair, and medical assistant are the other vocational areas covered.) (JH)
Descriptors: Buildings; Cleaning; *Learning Activities; Learning Modules; *Maintenance; *Mild Mental Retardation; Special Education; *Vocational Education; Young Adults

ED158086 08 CE017564

Multiple Learning Strategies Project. Building Maintenance & Engineering. Educable Mentally Impaired. Vol. 2.

Constantini, Debra; And Others

Ingham Intermediate School District, Mason, Mich. Capital Area Career Center.

May 1977 367p.; For related documents see CE 017 554-583

Sponsoring Agency: Bureau of Occupational and Adult Education (DHEW/OE), Washington, D.C.

Bureau No.: 498AH60038

Grant No.: G007603808

EDRS Price - MF01/PC15 Plus Postage.

Language: English

Document Type: CLASSROOM MATERIAL (050)

Geographic Source: U.S.; Michigan

Journal Announcement: RIEJAN79

This instructional package is one of three designed for educable mentally impaired students in the vocational area of building maintenance and engineering. The thirty-four learning modules are organized into six units: general maintenance tasks; restrooms; chalkboards; carpet care; office cleaning; and grounds. Each module includes these elements: a performance objective page which tells the student what will be learned, what materials are needed, and what the student must do in the module; and a job step page written in a read (cognitive information), look (graphic illustrations), do (instructions), and check (student is evaluated by teacher) format. (This document and related documents CE 017 563 and CE 017 565 are one of four sets of learning modules on building maintenance and engineering. The other three sets are written in formats designed for regular vocational, visually impaired, and low reader students. The modules are part of a total set of over 1,300 modules written for different student populations. Graphics, dietetic assistant, small engine repair, and medical assistant are the other vocational areas covered. CE 017 554 is the final report of the project to develop the modules.) (JH)

Descriptors: Buildings; Cleaning; *Learning Activities; Learning Modules; *Maintenance; *Mild Mental Retardation; Special Education; *Vocational Education; Young Adults

ED158087 08 CE017565

Multiple Learning Strategies Project. Building Maintenance & Engineering. Educable Mentally Impaired. Vol. 3.

Steinberg, Alan; And Others

Ingham Intermediate School District, Mason, Mich. Capital Area Career Center.

18 Mar 1977 319p.; For related documents see CE 017 554-583

Sponsoring Agency: Bureau of Occupational and Adult Education (DHEW/OE), Washington, D.C.

Bureau No.: 498AH60038

Grant No.: G007603808

EDRS Price - MF01/PC13 Plus Postage.

Language: English

Document Type: CLASSROOM MATERIAL (050)

Geographic Source: U.S.; Michigan

Journal Announcement: RIEJAN79

This instructional package is one of three designed for educable mentally impaired students in the vocational area of building maintenance and engineering. The thirty-one learning modules are organized into nine units: grounds; sanitation; boiler maintenance and operation; power and hand tools; cabinet construction; repair of damaged furniture; windows; and door maintenance. Each module includes these elements: a performance objective page which tells the student what will be learned, what materials are needed, and what the student must do in the module; and a job step page written in a read (cognitive information), look (graphic illustrations), do (instructions), and check (student is evaluated by teacher) format. (This document and related documents CE 017 564 and CE 017 563 are one of four sets of learning modules on maintenance and engineering. The other three sets are written in formats designed for regular vocational, visually impaired, and low-reader students. The modules are part of a total set of over 1,300 modules written for different student populations. Graphics, dietetic assistant, small engine repair, and medical assistant are the other vocational areas covered. CE 017 554 is the final report of the project to develop the modules.) (JH)

Descriptors: Buildings; Cleaning; *Learning Activities; *Learning Modules; *Maintenance; *Mild Mental Retardation; Repair; Special Education; *Vocational Education; Young Adults

ED158103 08 CE017581

Multiple Learning Strategies Project. Small Engine Repair Service. Low Reader-Educable Mentally Impaired. Vol. 1.

Pitts, Jim; And Others

Ingham Intermediate School District, Mason, Mich. Capital Area Career Center.

Jan 1978 434p.; For related documents see CE 017 554-583

Sponsoring Agency: Bureau of Occupational and Adult Education (DHEW/OE), Washington, D.C.

Bureau No.: 498AH60038

Grant No.: G007603808

EDRS Price - MF01/PC18 Plus Postage.

Language: English

Document Type: CLASSROOM MATERIAL (050)

Geographic Source: U.S.; Michigan

Journal Announcement: RIEJAN79

This instructional package, one of two designed for low reader-educable mentally impaired students, focuses on the vocational area of small engine repair service. (Low readers are identified as those reading at a 3-6 grade level.) Contained in this document are forty-three learning modules organized into nine units: engine block; air cleaner; starters; fuel tank, lines, filters and pumps; carburetors; electrical; magnetic system; lubrication; and gear boxes and drive trains. Each module includes these elements: a performance objective page that describes what the student will learn, materials needed, and how performance will be evaluated; information pages including special material not incorporated into the job steps; and job step pages which detail the steps necessary to do the task. This document and CE 017 582 are one of three sets of learning modules on small engine repair. The other two sets are written in formats designed for visually impaired and regular vocational students. The modules are part of a total set which includes over 1,300 modules written for different student populations. Building maintenance, dietetic assistant, medical assistant, and graphics are the other vocational areas covered. (JH)

Descriptors: Engines; *Learning Activities; Learning Modules; *Mild Mental Retardation; *Reading Difficulties; Repair; Special Education; *Trade and Industrial Education; *Vocational Education; Young Adults

Identifiers: Small Engines

ED158104 08 CE017582

Multiple Learning Strategies Project. Small Engine Repair Service. Low Reader-Educable Mentally Impaired. Vol. 2.

White, Debi; And Others

Ingham Intermediate School District, Mason, Mich. Capital Area Career Center.

Jan 1978 481p.; For related documents see CE 017 554-583

Sponsoring Agency: Bureau of Occupational and Adult Education (DHEW/OE), Washington, D.C.

Bureau No.: 498AH60038

Grant No.: G007603808

EDRS Price - MF02/PC20 Plus Postage.

Language: English

Document Type: CLASSROOM MATERIAL (050)

Geographic Source: U.S.; Michigan

Journal Announcement: RIEJAN79

This instructional package, one of two designed for low reader-educable mentally impaired students, focuses on the vocational area of small engine repair service. (Low readers are identified as those at a reading level of grades 3-6.) Contained in this document are fifty learning modules organized into twelve units: sharpening and grinding mowers; test equipment; motorcycles; engine removal and replacement; machining; tune-ups; short blocks; storage; filling out forms; ring and piston service; valve service; and overhaul. Each module includes these elements: a performance objective page that describes what the student will learn, materials needed, and how performance will be evaluated; information pages including special material not incorporated into the job steps; and job step pages which detail the steps necessary to do the task. (This document and CE 017 581 are one of three sets of learning modules on small engine repair written in formats designed for low reader-educable mentally impaired, visually impaired, and regular vocational students. These modules are part of a total set which includes over 1,300 modules written in a variety of formats on building maintenance, dietetic assistant, small engine repair, medical assistant, and graphics.) (JH)

Descriptors: *Auto Mechanics; Engines; *Learning Activities; Learning Modules; *Mild Mental Retardation; *Reading Difficulties; Reading Level; Repair; Special Education; *Trade and Industrial Education; *Vocational Education; Young Adults

ED183863 CE024443
Project S.P.I.C.E. Special Partnership in Career Education. Self-Awareness. A Teaching Module.
Volusia County Schools, Daytona Beach, Fla.
Aug 1979 70p.; For related documents see CE 024 444-450, ED 163 226, and ED 167 775.
Sponsoring Agency: Office of Career Education (DHEW/OE), Washington, D.C.
Bureau No.: 554AH80167
Grant No.: G007802013
EDRS Price - MF01/PC03 Plus Postage.
Language: English
Document Type: TEACHING GUIDE (052)
Geographic Source: U.S.; Florida
Journal Announcement: RIEAUG80
This first in a series of six teaching modules on self-awareness is part of the Special Partnership in Career Education (SPICE) program, which was designed to provide career awareness and exploration information to junior high-aged educable mentally handicapped students. The module follows a typical format that includes two major sections: overview and activities. The overview includes module objectives, student performance objectives, module organization, module utilization, and assessing student activities. The activities section contains learning activities for three units of instruction. In addition to identifying learning activities, each unit specifies student performance objectives and subject areas covered. Assessment instruments and student worksheets are appended. (LRA)
Descriptors: *Career Awareness; *Career Education; *Career Exploration; Fused Curriculum; Junior High Schools; Learning Activities; *Mild Mental Retardation; *Self Concept; Teaching Guides
Identifiers: Education Amendments 1974; Florida (Volusia County); Project SPICE

ED183866 CE024446
Project S.P.I.C.E. Special Partnership in Career Education. Attitudes and Appreciations. A Teaching Module.
Volusia County Schools, Daytona Beach, Fla.
Aug 1979 40p.; For related documents see CE 024 443-450, ED 163 226, and ED 167 775.
Sponsoring Agency: Office of Career Education (DHEW/OE), Washington, D.C.
Bureau No.: 554AH80167
Grant No.: G007802013
EDRS Price - MF01/PC02 Plus Postage.
Language: English
Document Type: TEACHING GUIDE (052)
Geographic Source: U.S.; Florida
Journal Announcement: RIEAUG80
This second in a series of six teaching modules on attitudes and appreciations is part of the Special Partnership in Career Education (SPICE) program, which was designed to provide career awareness and exploration information to junior high-aged educable mentally handicapped students. The module follows a typical format that includes two major sections: overview and activities. The overview includes module objectives, student performance objectives, module organization, module utilization, and assessing student activities. The activities section contains learing activities for two units of instruction. In addition to identifying learning activities, each unit specifies student performance objectives and subject areas covered. Assessment instruments and student worksheets are appended. (LRA)
Descriptors: Affective Behavior; *Career Awareness; *Career Education; *Career Exploration; Fused Curriculum; Junior High Schools; Learning Activities; *Mild Mental Retardation; Student Attitudes; Teaching Guides; *Work Attitudes
Identifiers: Education Amendments 1974; Florida (Volusia County); Project SPICE

ED183865 CE024445

Project S.P.I.C.E. Special Partnership in Career Education. Career/Educational Awareness. A Teaching Module.

Volusia County Schools, Daytona Beach, Fla.

Aug 1979 27p.; For related documents see CE 024 443-450, ED 163 226, and ED 167 775.

Sponsoring Agency: Office of Career Education (DHEW/OE), Washington, D.C.

Bureau No.: 554AH80167

Grant No.: G007802013

EDRS Price - MF01/PC02 Plus Postage.

Language: English

Document Type: TEACHING GUIDE (052)

Geographic Source: U.S.; Florida

Journal Announcement: RIEAUG80

This third in a series of six teaching modules on career/educational awareness is part of the Special Partnership in Career Education (SPICE) program, which was designed to provide career awareness and exploration information to junior high-aged educable mentally handicapped students. The module follows a typical format that includes two major sections: overview and activities. The overview includes module objectives, student performance objectives, module organization, module utilization, and assessing student activities. The activities section contains learning activities for one unit of instruction. In addition to identifying learning activities, each unit specifies student performance objectives and subject areas covered. Assessment instruments and student worksheets are appended. (LRA)

Descriptors: *Career Awareness; *Career Education; *Career Exploration; Fused Curriculum; Junior High Schools; Learning Activities; *Mild Mental Retardation; Teaching Guides

Identifiers: Education Amendments 1974; Florida (Volusia County); Project SPICE

ED183868 CE024448

Project S.P.I.C.E. Special Partnership in Career Education. Decision Making/Beginning Competency. A Teaching Module.

Volusia County Schools, Daytona Beach, Fla.

Aug 1979 38p.; For related documents see CE 024 443-450, ED 163 226, and ED 167 775.

Sponsoring Agency: Office of Career Education (DHEW/OE), Washington, D.C.

Bureau No.: 554AH80167

Grant No.: G007802013

EDRS Price - MF01/PC02 Plus Postage.

Language: English

Document Type: TEACHING GUIDE (052)

Geographic Source: U.S.; Florida

Journal Announcement: RIEAUG80

This fourth in a series of six teaching modules on decision making/beginning competency is part of the Special Partnership in Career Education (SPICE) program, which was designed to provide career awareness and exploration information to junior high-aged educable mentally handicapped students. The module follows a typical format that includes two major sections: overview and activities. The overview includes module objectives, student performance objectives, module organization, module utilization, and assessing student activities. The activities section contains learning activities for two units of instruction. In addition to identifying learning activities, each unit specifies student performance objectives and subject areas covered. Assessment instruments and student worksheets are appended. (LRA)

Descriptors: *Career Awareness; *Career Education; *Career Exploration; *Decision Making; Fused Curriculum; Junior High Schools; Learning Activities; *Mild Mental Retardation; Teaching Guides

Identifiers: Education Amendments 1974; Florida (Volusia County); Project SPICE

ED183869 CE024449

Project S.P.I.C.E. Special Partnership in Career Education. Economic Awareness. A Teaching Module.

Volusia County Schools, Daytona Beach, Fla.

Aug 1979 53p.; For related documents see CE 024 443-450, ED 163 226, and ED 167 775.

Sponsoring Agency: Office of Career Education (DHEW/OE), Washington, D.C.

Bureau No.: 554AH80167

Grant No.: G007802013

EDRS Price - MF01/PC03 Plus Postage.

Language: English

Document Type: TEACHING GUIDE (052)

Geographic Source: U.S.; Florida

Journal Announcement: RIEAUG80

This fifth in a series of six modules on economic awareness is part of the Special Partnership in Career Education (SPICE) program, which was designed to provide career awareness and exploration information to junior high-aged educable mentally handicapped students. The module follows a typical format that includes two major sections: overview and activities. The overview includes module objectives, student performance objectives, module organization, module utilization, and assessing student activities. The activities section contains learning activities for seven units of instruction. In addition to identifying learning activities, each unit specifies student performance objectives and subject areas covered. Assessment instruments and student worksheets are appended. (LRA)

Descriptors: *Career Awareness; *Career Education; *Career Exploration; *Economics Education; Fused Curriculum; Junior High Schools; Learning Activities; *Mild Mental Retardation; Teaching Guides

Identifiers: Education Amendments 1974; Florida (Volusia County); Project SPICE

ED183867 CE024447

Project S.P.I.C.E. Special Partnership in Career Education. Employability Skills. A Teaching Module.

Volusia County Schools, Daytona Beach, Fla.

Aug 1979 39p.; For related documents see CE 024 445-450, ED 163 226, and ED 167 775.

Sponsoring Agency: Office of Career Education (DHEW/OE), Washington, D.C.

Bureau No.: 554AH80167

Grant No.: G007802013

EDRS Price - MF01/PC02 Plus Postage.

Language: English

Document Type: TEACHING GUIDE (052)

Geographic Source: U.S.; Florida

Journal Announcement: RIEAUG80

This sixth in a series of six teaching modules on employability skills is part of the Special Partnership in Career Education (SPICE) program, which was designed to provide career awareness and exploration information to junior high-aged educable mentally handicapped students. The module follows a typical format that includes two major sections: overview and activities. The overview includes module objectives, student performance objectives, module organization, module utilization, and assessing student activities. The activities section contains learning activities for two units of instruction. In addition to identifying learning activities, each unit specifies student performance objectives and subject areas covered. Assessment instruments and student worksheets are appended. (LRA)

Descriptors: *Career Awareness; *Career Education; *Career Exploration; Fused Curriculum; *Job Skills; Junior High Schools; Learning Activities; *Mild Mental Retardation; Teaching Guides

Identifiers: Education Amendments 1974; Florida (Volusia County); Project SPICE

Attachment F

Additional References on the Use of Other Media

DEAF-BLIND

ED135198 EC093174
The Media As an Instructional Aid with the Deaf-Blind. Proceedings.
Rouin, Carole
California State Dept. of Education, Sacramento.; Southwestern Region Deaf-Blind Center, Sacramento, Calif.
1976 30p.; Proceedings of a national workshop (December 10-12, 1975)
Sponsoring Agency: Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C. Centers and Services for Deaf-Blind Children.
EDRS Price - MF01/PC02 Plus Postage.
Language: ENGLISH
Document Type: CONFERENCE PROCEEDINGS (021)
Journal Announcement: RIEJUL77
Presented are the proceedings of a national workshop, titled "Media as an Instructional Aid with the Deaf-Blind", designed to introduce new ideas, techniques, and approaches to media production methods for the deaf-blind and to examine copyright laws as they pertain to reproduction of materials for educational use. Entries by media personnel currently involved in producing materials for deaf-blind educational programs include the following titles: "To Tinker or Not to Tinker" (a discussion on whether or not to use videotape) by P. Utz, "Audio Reproductions in Media" by B. Fletcher, "Documentary Production" by D. Barclay, "Video Production in Media" by T. Smith and H. Story, "How to Conduct a Workshop in Preparing 'Hands-On' Materials for Deaf-Blind Children" by M. Tarling, "Copyright Law and How It Pertains to and Affects Media in Education" by G. Fuhrig, and "Copyright Permission--A Guide for Noncommercial Use from the Association of American Publishers". (SBH)
Descriptors: Conference Reports; *Copyrights; *Deaf Blind; *Educational Media; Elementary Secondary Education; Multiple Disabilities; Severe Disabilities; Workshops

HEARING IMPAIRED-DEAF

EJ236301 EC131522
Apple Tree: Branches Instructional Materials Used in the Apple Tree Program.
Krohn, Em
American Annals of the Deaf, v125 n6 p773-74 Sep 1980
Reprint: UMI
Language: English
Document Type: JOURNAL ARTICLE (080); TEACHING GUIDE (052)
Teacher designed instructional materials for teaching written language to deaf children are described and the importance of visual aids in their presentation is emphasized. (CL)
Descriptors: *Deafness; *English Instruction; *Instructional Materials; Language Skills; Teacher Developed Materials; *Visual Aids; *Written Language

EC131529
The Role of Media in the Classroom--It's Another ""Aide.''
Read, Lois
American Annals of the Deaf (Back to Media: How to Use Better What You Already Have) v125 n6 p802-06 Sep 1980; 1980-Sep 5P.
UMI
EDRS: NOT AVAILABLE
The author discusses aspects to be considered by resource room teachers of deaf students to implement media in the classroom. Among topics discussed are student needs, degree of mainstreaming, media equipment and personnel, and preparation and use of materials. (CL)
Descriptors: *Deafness/ *Resource Room Programs/ *Educational Media/ Classroom Techniques/ Mainstreaming

ED145646 EC102671
Hard-of-Hearing Child in the Regular Classroom. Final Report.
Oakland County Schools, Pontiac, Mich.
1975 116p.
Sponsoring Agency: Bureau of Elementary and Secondary Education (DHEW/OE), Washington, D.C.
EDRS Price - MF01/PC05 Plus Postage.
Language: ENGLISH
Document Type: RESEARCH REPORT (143)
Journal Announcement: RIEMAR78
Presented is the final report of a Title III research project to determine the education status of 58 elementary school children with mild hearing loss and to devise a management package that could be utilized by a regular classroom teacher. Sections address the following project components: goals (including comparison of three treatment procedures--audio-visual program, FM transmitter, and teacher counselor service); subjects; testing procedure (which included the Wide Range Achievement Test and speech discrimination testing); treatment procedures (detailed descriptions of the audio-visual units and FM wireless transmitters); and academic achievement (a report on data obtained from monitoring Ss). Among conclusions are that a hearing loss may only cause communication problems and not interfere with learning; that hearing loss may be considered a cause of poor achievement; and that classroom teachers are in the best position to assess the hearing loss factor. Appendixes include management guides which cover such areas as introduction of wireless FM systems to a regular classroom teacher; a summary of questionnaire responses from parents and regular classroom teachers regarding good and poor achievers; and statistical data on test results. (SBH)
Descriptors: *Academic Achievement; *Audio Equipment; *Audiovisual Instruction; Elementary Education; Exceptional Child Research; Hearing Impairments; *Intervention; *Mainstreaming; Parent Attitudes; *Partial Hearing; Program Effectiveness; Statistical Data; Teacher Attitudes; Teacher Role
Identifiers: *Final Reports

ED149502 EC103574
Learning Aids for the Hearing Impaired Child.
National Learning Resource Center of Pennsylvania, King of Prussia.
1977 23p.; For related information, see EC 103 572 - EC 103 578
Sponsoring Agency: Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C.; Pennsylvania State Dept. of Education, Harrisburg. Bureau of Special and Compensatory Education.
Contract No.: OEC-0-74-7892
EDRS Price - MF01/PC01 Plus Postage.
Language: ENGLISH
Document Type: CLASSROOM MATERIAL (050)
Journal Announcement: RIEJUN78
Intended for parents, the booklet provides a practical guide to the types of learning aids that are helpful to the hearing impaired child. Sections cover the following: an explanation of residual hearing; types of hearing aids and hearing aid equipment; language development aids (brief descriptions are provided for materials in beginning language, listening skills, reading, training for parents, sign language training, and speechreading); aids to communication (including tele-typewriters and telephone aids); and aids to daily living (such as a vibrating alarm clock, captioned television programs, and TTY--tele-typewriter--service). In many instances, the cost information is provided. Appended are the addresses of state and satellite health centers, a checklist for testing a hearing aid, and a directory of producers and distributors of materials. (SBH)
Descriptors: *Educational Media; *Hearing Aids; *Hearing Impairments; *Instructional Materials; Resource Materials; *Sensory Aids
Identifiers: *Parent Resources

MENTALLY RETARDED

EC123481
Handicapped Students Learn Language Skills with Communication Boards.
Detamore, Kristie L.; Lippke, Barbara A.
Teaching Exceptional Children v12 n3 p104-06 Spr 1980; 19 80-Spr 3P.
EDRS: NOT AVAILABLE
Communication or picture boards are described as a successful alternative method for teaching language skills to mentally handicapped students. Reasons for using the communication board are pointed out, procedures for adapting the boards to meet classroom and student needs are considered, and requirements for board design are reviewed. (SBH)
Descriptors: *Mental Retardation/ *Language Acquisition/ *Instructional Materials/ *Nonverbal Communication/ Teaching Methods/ Material Development
Identifiers: *Communication Boards

ED142767 08 CE011779
Mainstreaming the Handicapped in Vocational Education. Serving the Mentally Retarded.
Smith, Claudette
American Institutes for Research in the Behavioral Sciences, Palo Alto, Calif.
1977 69p.; For related documents see CE 011 759-761, CE 778-781, and CE 011 868
Sponsoring Agency: Bureau of Occupational and Adult Education (DHEW/OE), Washington, D.C.
Grant No.: G007500391
EDRS Price - MF01/PC03 Plus Postage.
Language: ENGLISH
Document Type: CLASSROOM MATERIAL (050)
Journal Announcement: RIEJAN78
One of a series of seven modules developed to improve the knowledge and skills of vocational educators who are or who will be serving the handicapped in regular vocational education settings, this module, dealing primarily with the educable mentally retarded (EMR), is designed to (1) explain what mental retardation is and to explore the range of vocational capabilities of the mentally retarded student, (2) present the vocational educator with guidelines for establishing and carrying out a plan of individualized instruction for the retarded student, and (3) provide listings of resource agencies and further readings to assist the vocational educator who is working with the mentally retarded. Important points in setting up an individualized instructional program for mentally handicapped students are considered and suggestions are made for modifying existing programs to overcome problems. Two final sections cover (1) bibliographic sources and resource agencies and persons to contact for assistance, and (2) a set of problems/questions designed to enable the vocational educator to check his or her understanding of the ideas presented in the module, and to apply the principles discussed to his or her own teaching situation. (Author/HD)
Descriptors: Agencies; Educational Resources; Federal Government; Guides; Handicapped Students; Higher Education; *Individual Characteristics; *Individualized Instruction; Inservice Education; Inservice Teacher Education; Instructional Materials; Instructional Programs; Learning Modules; *Mainstreaming; *Mild Mental Retardation; National Organizations; Preservice Teacher Education; Private Agencies; *Program Development; State Agencies; Student Placement; Teaching Guides; *Vocational Education; Work Experience Programs

EC123701
Daily Living Skills.
19 5P.
Note: 4 filmstrips, cassettes, 32 skill extenders, teacher's guide/color.
Society for Visual Education, Inc., 1345 Diversey Parkway, Chicago, IL 60614 ($104.00, each filmstrip $17.50; still extenders and teacher's guide $26.00, each cassette $8.50)
EDRS: NOT AVAILABLE
Intended for use with educable mentally handicapped adolescents and young adults, the kit includes four filmstrips, four associated cassettes, 32 skill extenders (work sheets), and a teacher's manual. Each filmstrip focuses on one of the following basic skills: finding a place to live, nutrition and food preparation, personal health and hygiene, and consumer skills. The teacher's manual provides a summary of the objectives and content of each filmstrip, a listing of prerequisite skills and the skills to be developed, and suggestions for prefilmstrip discussion, postfilmstrip discussion, and classroom activities. The script of the accompanying cassettes is also provided. (DB)
Descriptors: *Mild Mental Retardation/ Secondary Education/ *Daily Living Skills/ Filmstrips/ Instructional Media/ Class Activities/ Teaching Guides/ *Housing Needs/ *Nutrition/ Food/ *Self Care Skills/ Hygiene/ *Consumer Education

MENTALLY RETARDED-VOCATIONAL

ED142774 08 CE011868
Improving Vocational Education Services for Handicapped Students. Final Report.
Weisgerber, Robert A.; Smith, Claudette A.
American Institutes for Research in the Behavioral Sciences, Palo Alto, Calif.
Mar 1977 45p.; For related documents see CE 011 759-761, CE 011 778-781, and CE 011 868
Sponsoring Agency: Bureau of Occupational and Adult Education (DHEW/OE), Washington, D.C.
Report No.: AIR-53100-3-77-FR Bureau No.: 498AH50190
Grant No.: G007500391
EDRS Price - MF01/PC02 Plus Postage.
Language: ENGLISH
Document Type: PROJECT DESCRIPTION (141)
Journal Announcement: RIEJAN78
The project was designed to develop a comprehensive set of instructional materials for use in the training of vocational educators who will be instructing handicapped students as a part of their regular classes. These materials were to convey information at various levels of specificity, including (1) a general understanding of the attitudes, problems, and concerns which affect the handicapped group, (2) an awareness of the needs arising from selected types of disabilities and impairments, and (3) a strategy for use when planning education for a handicapped student. Priorities for content in the resulting seven modules of instruction were established cooperatively with an advisory panel, and were developed in cooperation with consultants knowledgeable in the various handicapping conditions. Overall, the modules were found to meet or surpass the evaluators' expectations in terms of providing information on five main ideas: Rights and entitlements, attitudes toward the handicapped, information about different handicapped conditions, training the handicapped for competitive employment, and helping a particular handicapped student. (Author/HD)
Descriptors: Administrator Education; Attitude Change; Civil Liberties; Deafness; Educational Planning; *Handicapped Students; Higher Education; Inservice Education; Inservice Teacher Education; Instructional Materials; Learning Modules; *Mainstreaming; *Material Development; Mild Mental Retardation; Partial Hearing; Physical Disabilities; Postsecondary Education; Preservice Teacher Education; *Program Effectiveness; Program Evaluation; School Personnel; Secondary Education; Skill Development; Speech Handicaps; Student Needs; Teaching Skills; Visual Impairments; *Vocational Education; Vocational Education Teachers

ED142703 08 CE011324

Evaluation of Personalized, Individualized, Vocational Occupations Training. Final Report.

Philadelphia School District, Pa.

Mar 1977 85p.

Sponsoring Agency: National Center for Educational Research and Development (DHEW/OE), Washington, D.C.

Bureau No.: 498AH50297

Grant No.: G007500452

EDRS Price - MF01/PC04 Plus Postage.

Language: ENGLISH

Document Type: RESEARCH REPORT (143)

Journal Announcement: RIEJAN78

A study was conducted to determine whether or not the Personalized, Individualized, Vocational Occupations Training (PIVOT) materials developed by the School District of Philadelphia were capable of developing entry-level competency in secondary school students in a variety of educational settings (comprehensive high schools, an occupational school for educable mentally retarded, a skills center, and an area vocational-technical school) and subject areas (nurse's aide, industrial electricity, automotive mechanics, and machine tool trades). Experimental classes, using the PIVOT materials, were taught by means of individual sound-on-slide projectors, while control classes were taught the same material by conventional methods. Comparison of rates of success on a criterion task in each subject area proved the PIVOT method capable of developing entry-level competency in each setting. No significant differences were detected however between effects of the PIVOT materials and conventional methods except for educable mentally retarded students, who learned significantly better with the PIVOT materials. Repetition of the experiment with larger groups of students is recommended. Appendixes, which comprise three-fourths of the document, include lists of PIVOT units, the criterion tasks and checklists for units used in the research, the rating form for individual slides and definitions of possible defects, samples of printed materials used with the PIVOT units, and the research questionnaires. (Author/BM)

Descriptors: Academic Achievement; *Audiovisual Instruction; Bilingual Students; Comparative Analysis; *Conventional Instruction; Criterion Referenced Tests; *Curriculum Evaluation; Curriculum Research; *Educational Environment; Experimental Groups; High Schools; *Individualized Instruction; *Job Skills; Mild Mental Retardation; Regional Schools; Secondary Education; Spanish Speaking; *Vocational Education; Vocational Schools; Vocational Training Centers

Identifiers: Pennsylvania (Philadelphia)

EJ236789 EC131510

Creating Visual Materials for Multi-Handicapped Deaf Learners.

Hack, Carole; Brosmith, Susan

American Annals of the Deaf, v125 n6 p702-09 Sep 1980

Reprint: UMI

Language: English

Document Type: JOURNAL ARTICLE (080); TEACHING GUIDE (052)

The article describes two groups of visual materials developed for multiply handicapped deaf teenagers. The daily living skills project includes vocabulary lists, visuals, games and a model related to household cleaning, personal grooming, or consumer skills. The occupational information project includes visuals of tools, materials, and clothing for 22 jobs. (CL)

Descriptors: Consumer Education; *Daily Living Skills; *Deafness; Job Skills; *Multiple Disabilities; *Occupational Information; Secondary Education; *Visual Aids

EJ190583 EC110987

An Electrical Communication System for a Nonverbal, Profoundly Retarded Spastic Quadriplegic.

Kucherawy, David A.; Kucherawy, Jenny M.

Education and Training of the Mentally Retarded, v13 n3 p342-44 Oct 1978

Language: ENGLISH

The article describes the use of an electrical communication system (the Cocom Center Model 25) to establish communication with and more accurately assess an apparently profoundly retarded, nonverbal, 28-year-old spastic quadriplegic female. (Author/PHR)

Descriptors: *Cerebral Palsy; Clinical Diagnosis; Evaluation Methods; Mental Retardation; Multiple Disabilities; Neurological Impairments; *Nonverbal Communication; *Severe Disabilities; *Telecommunications

Identifiers: *Cocum Center Model 25

ED176512 EC120607

The Development of a Program in Orientation and Mobility for Multiply Impaired Low Vision Children. Final Report.

Harley, Randall K.; And Others

George Peabody Coll. for Teachers, Nashville, Tenn.

15 Mar 1978 97p.

Sponsoring Agency: Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C.

Bureau No.: 443CH60168

Grant No.: G007605199

Available from: Stoelting Company, 1350 S. Kostner Avenue, Chicago, Illinois 60623

EDRS Price - MF01/PC04 Plus Postage.

Language: English

Document Type: RESEARCH REPORT (143); TEACHING GUIDE (052)

Geographic Source: U.S.; Tennessee

Journal Announcement: RIEFEB80

The report details the project to develop programed instruction (in which each lesson is programed in small sequential steps) in visual orientation and mobility for multi-impaired low vision children (from preschool age to early adulthood). An introductory section reviews literature showing a need for orientation and mobility instruction; and describes a study to develop, refine, and validate a revised and improved manual in orientation and mobility for multiply impaired blind children. A positive field test with 42 children (4-13 years old) supported the effectiveness of the programed intervention system. A second section focuses on the adaptation of the Peabody Mobility Scale (PMS) for low vision children. A programed instructional system was organized into the same four separate components as the PMS (motor development, vision utilization, concept development, and mobility and orientation skills), and was field tested with 85 visually impaired multiply handicapped children. Ss who received instruction based on the programed intervention system demonstrated significant overall performance gains. Among appended materials are raw data, sample profiles, PMS excerpts, excerpts from programed instructional materials, and sample vision screening and teacher evaluation forms. (SBH)

Descriptors: *Competency Based Education; Exceptional Child Research; Field Studies; Instructional Materials; *Material Development; *Multiple Disabilities; Partial Vision; Task Analysis; Teaching Guides; *Visual Impairments; *Visually Handicapped Mobility

Identifiers: *Peabody Mobility Scale

ED142749 OB CE011761

Mainstreaming the Handicapped in Vocational Education. Serving the Communication Impaired.

Maloney, Patricia; Weisgerber, Robert

American Institutes for Research in the Behavioral Sciences, Palo Alto, Calif.

1977 61p.; For related documents see CE 011 759-761, CE 778-781, and CE 011 868

Sponsoring Agency: Bureau of Occupational and Adult Education (DHEW/OE), Washington, D.C.

Grant No.: G007500391

EDRS Price - MF01/PC03 Plus Postage.

Language: ENGLISH

Document Type: CLASSROOM MATERIAL (050)

Journal Announcement: RIEJAN78

One of a series of seven modules developed to improve the knowledge and skills of vocational educators who are or will become involved in teaching handicapped students in regular education settings, this module, concerned with communication impaired students (those who are deaf or hard of hearing and those who have speech impairments), is designed to (1) explain the meaning of a communication handicap--what it is, what the range of severity is, and how it affects the student's vocational performance, (2) present the vocational educator with guidelines for establishing and carrying out a plan of individualized instruction for the student, and (3) provide listings of resource agencies and further readings to assist the vocational educator who is working with the student with a communication handicap. Important points in setting up an individualized instructional program are considered and suggestions are made for modifying existing programs to overcome problems. Two final sections cover (1) bibliographic sources and resource agencies and persons to contact for assistance, and (2) a set of problems/questions designed to enable the vocational educator to check his or her understanding of the ideas presented in the module and to apply the principles discussed to his or her own teaching situation. (Author/HD)

Descriptors: Agencies; Communication Skills; Deafness; Educational Resources; Federal Government; Finger Spelling; Guides; Handicapped Students; Higher Education; *Individual Characteristics; *Individualized Instruction; Inservice Education; Inservice Teacher Education; Instructional Materials; Instructional Programs; Learning Modules; *Mainstreaming; National Organizations; Partial Hearing; Postsecondary Education; Private Agencies; *Program Development; Secondary Education; *Speech Handicaps; State Agencies; Student Placement; Teaching Guides; *Vocational Education; Work Experience Programs

ED195465 SO012978
Teaching the Visually Impaired Child in the Regular Classroom. MAVIS Sourcebook 3.
Leslie, Madge
Social Science Education Consortium, Inc., Boulder, Colo.
1980 31p.; For related documents, see SO 012 976-981.
Sponsoring Agency: Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C.
Report No.: ISBN-0-89994-255-5
Available from: Social Science Education Consortium, Inc., 855 Broadway, Boulder, CO 80302 ($15.00 per set).
EDRS Price - MF01 Plus Postage. PC Not Available from EDRS.
Language: English
Document Type: TEACHING GUIDE (052)
Geographic Source: U.S.; Colorado
Journal Announcement: RIEAPR81

Information in this pamphlet will enable regular classroom teachers to plan for accepting visually impaired children into their classes. It specifically reviews elements of the planning process, appropriate goals for the child, roles of the regular teacher and resource teacher, and special materials and classroom strategies. Opening chapters define legal blindness, describe requirements of the Education for All Handicapped Children Act of 1975, and differentiate between general and specific goals for visually impaired children. Chapter three explains the different roles of the regular teacher, resource teacher, administrator, parents, and child in effectively implementing the special educational program. Chapter four summarizes availability of special equipment (braille writers, slate and stylus, optical aids, and long canes), special materials (braille readers and large print books), and support services (consultants and reader services). Chapter five gives specific suggestions for arranging the classroom and the visually impaired child's work area, and for orienting the new child to the classroom, hallways, cafeteria, bathrooms, and playground. Chapter six recommends strategies for successful grouping and peer relationships, written work, field trips, and use of audiovisual materials. It also gives tips on how to develop the child's organizational, communication, listening, and daily-living. (AV)

Descriptors: Administrator Role; Children; Classroom Design; Educational Equipment; Educational Objectives; *Educational Strategies; Elementary Secondary Education; Individualized Education Programs; Itinerant Teachers; *Mainstreaming; Media Selection; Parent Role; Peer Acceptance; Skill Development; Social Studies; Student Role; Teacher Effectiveness; Teacher Role; Teaching Guides; *Visual Impairments; Visually Handicapped Mobility
Identifiers: Education for All Handicapped Children Act; Project MAVIS

ED149503 EC103575
Learning Aids for the Visually Impaired Child.
National Learning Resource Center of Pennsylvania, King of Prussia.
1977 20p.; For related information, see EC 103 572 - EC 103 578
Sponsoring Agency: Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C.; Pennsylvania State Dept. of Education, Harrisburg. Bureau of Special and Compensatory Education.
Contract No.: OEC-0-74-7892
EDRS Price - MF01/PC01 Plus Postage.
Language: ENGLISH
Document Type: CLASSROOM MATERIAL (050)
Journal Announcement: RIEJUN78

Intended for parents, the booklet provides a practical guide to the types of learning aids that are helpful to the visually impaired child from preschool to post-school age. Aids for the preschool age are broken down into the following areas: materials for touching, materials for listening, materials for developing language, materials for developing body image, materials for learning to control movement, materials for self help, and materials to make at home. Sources for talking book materials appropriate for the school age child are given, and descriptions of materials for leisure time and daily living are offered. A source of information about special electronic devices for the post-school age child is cited. Cost information is provided for most of the materials mentioned. Appended are the addresses and telephone numbers for Optacon training programs and financial aid, a directory of Pennsylvania radio services for the visually impaired, and a directory of producers and distributors of materials. (SBH)

Descriptors: *Educational Media; *Educational Resources; Electromechanical Aids; Elementary Secondary Education; *Instructional Materials; Postsecondary Education; Preschool Education; Resource Materials; *Sensory Aids; *Visual Impairments
Identifiers: *Parent Resources

ED176456 EC120469

Billy: The Visually Impaired Child in Your Classroom.

Gear, Gayle; And Others

Alabama Univ., Birmingham. School of Education.

1979 28p.; For other booklets in the series, see EC 120 467-470

Sponsoring Agency: Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C. Div. of Personnel Preparation.

Available from: The Interrelated Teacher Education Project, The University of Alabama, Birmingham, Alabama 35294

EDRS Price - MF01 Plus Postage. PC Not Available from EDRS.

Language: English

Document Type: TEACHING GUIDE (052)

Geographic Source: U.S.; Alabama

Journal Announcement: RIEFEB80

Intended for regular class teachers, the booklet provides information to aid in mainstreaming the visually impaired (VH) child. Sections address the following areas: characteristics of the VH child (legal and educational definitions, common visual defects, etiology); identification and signs of visual problems (warning symptoms); the vision specialist and assessment team; behavior patterns (suggestions for teaching the VH child); and special equipment and resources (writing equipment, mathematics equipment, and audio aids and reading materials). (SBH)

Descriptors: Behavior Patterns; Definitions; Educational Media; Elementary Secondary Education; Etiology; *Identification; *Mainstreaming; Resources; Sensory Aids; *Student Characteristics; *Student Evaluation; Teaching Guides ; *Teaching Methods; *Visual Impairments

EC123702

Special Education Techniques: Lab Science and Art.

19 5P.

Note: 24min/sound/color/16mm.

McGraw-Hill Films, 110 15th St., Del Mar, CA 92014 ($375.00; Rental $38.00 for 1 to 4 days, Code: 106721-3)

EDRS: NOT AVAILABLE

Designed primarily for elementary and intermediate science teachers working with visually handicapped children and gifted blind children, the film shows the design, adaptations, teaching strategies, and implementation of laboratory science and art activities. The film presents a series of experiments, on topics such as the properties of gases, performed by elementary blind children using adapted equipment. Gifted intermediate students are seen using an impressive mastery of manipulative and conceptual skills. The accompanying instructor's guide provides discussion questions as well as background information and a synopsis of the film. (PHR)

Descriptors: *Blindness/ Visual Impairments/ Elementary Secondary Education/ Instructional Films/ Mainstreaming/ *Curriculum Development/ Science Equipment/ *Teaching Methods/ *Science Activities/ *Art Activities/ Educational Media

Identifiers: *Gifted Handicapped

ED129032 EC091332

The CI-TAB Secondary Program: Career Information and Training Activities for the Blind.

Swearengen, Mary-B Mosley

Education Service Center Region 19, El Paso, Tex.

1975 184p.

Sponsoring Agency: Texas Education Agency, Austin. Div. of Occupational Research and Development.

EDRS Price - MF01/PC08 Plus Postage.

Language: ENGLISH

Document Type: RESEARCH REPORT (143)

Journal Announcement: RIEFEB77

Presented is the CI-TAB (Career Information and Training Activities for the Blind) Secondary Program, a program providing career education for visually handicapped and blind high-school students to be available in braille and cassette recordings. Five general discussions (each including a list of concepts covered, suggested learning activities, and a list of test questions) are provided on the following topics: (1) producers and consumers, and goods and services; (2) employment agencies, job placement services, unions, and social security; (3) resumes, applications, and interviews; (4) job classifications and volunteer service; and (5) independence, responsibility, and freedom. Each of 30 job descriptions included answers the following questions: What must this worker do?, How many hours must this person work?, How much will this job pay?, What abilities will I need?, What else is important about this job?, What are the prospects and opportunities?, How can I prepare for this job?, and What other jobs are similar to this? Also included are general suggestions for career education and a list of approximately 50 sources of supplementary vocational materials. (IM)

Descriptors: *Blindness; *Career Education; *Curriculum Guides; Educational Media; *Employment Opportunities; Exceptional Child Education; *Occupational Information; Prevocational Education; Secondary Education; Tape Recordings; *Visual Impairments; Vocational Interests

VISUALLY IMPAIRED-VOCATIONAL

ED142766 08 CE011778

Mainstreaming the Handicapped in Vocational Education. Serving the Visually Handicapped.

Dillman, Caroline M.; Maloney, Patricia

American Institutes for Research in the Behavioral Sciences, Palo Alto, Calif.

1977 65p.; For related documents see CE 011 759-761, CE 778-781, and CE 011 868

Sponsoring Agency: Bureau of Occupational and Adult Education (DHEW/OE), Washington, D.C.

Grant No.: G007500391

EDRS Price - MF01/PC03 Plus Postage.

Language: ENGLISH

Document Type: CLASSROOM MATERIAL (050)

Journal Announcement: RIEJAN78

One of a series of seven modules developed to improve the knowledge and skills of vocational educators who are or will become involved in the instruction of handicapped students in regular (mainstream) classes, this module is intended for inservice training of vocational educators (including administrators, coordinators, counselors, and preservice trainees) working at the secondary level and focuses on developing a general understanding of the goals, components, and approaches used in regular vocational education programs involving the legally blind and partially seeing. Specifically, the purposes are (1) to familiarize vocational educators with particular handicapping conditions of the legally blind and partially seeing including terminology, variations in severity, and differing capabilities of these students (section 1), (2) to outline and discuss plans for individualizing instruction so that it will meet the needs of visually handicapped students and will simplify the educator's task in teaching these students (sections 2 and 3), and (3) to provide vocational educators with resource and referral agencies (State, Federal, private, and nonprofit) and with various publications that can aid them in dealing with visually handicapped students (covered in a separate Resources Section). (Author/HD)

Descriptors: Agencies; Audio Equipment; Blindness; Educational Equipment; Educational Media; Educational Resources; Electromechanical Aids; Federal Government; Guides; Handicapped Students; Higher Education; *Individual Characteristics; *Individualized Instruction; Inservice Education; Inservice Teacher Education; Instructional Materials; Instructional Programs; Learning Modules; *Mainstreaming; National Organizations; Partial Vision; Postsecondary Education; Private Agencies; *Program Development; Resource Materials; Secondary Education; State Agencies; Teaching Guides; Teaching Methods; *Visual Impairments; *Vocational Education

100 Reference: "Hearing aid vests for children." Exceptional Children, Vol. 44, #3, November, 1977, p. 226.

110 Contact: None

120 Strategy: Special ed/hearing impaired/hearing aid vests
Instructional materials/hearing impaired

130 Summary: Vests with inner pockets can enable small children to wear large hearing aid batteries. Such vests made by a volunteer agency or vest patterns are available from Alexander Graham Bell Chapter No. 15, Telephone Pioneers of America, 608 13th St. NW, Washington, D.C. 20005, phone (202) 392-2461.

140 Potential Users — Teachers/regular/special ed; counselors; parents

150 Population Affected — Teachers and parents of hearing impaired children

160 Objectives — To enable young and/or small children to wear large hearing aid batteries

170 Procedures — A specially designed vest has an inner pocket for a hearing aid battery, a channel under the shoulder, strap for the cord, and directly below the ear, a small button hole through which the cord emerges.

180 How Assessed/Results — The creation of a comfortable, efficient vest enables even very small children to wear large hearing aid batteries

190 Special Requirements — Pattern for vest

200 Costs — Vests and patterns for vests available free through the efforts of the Telephone Pioneers of America (Alexander Graham Bell Chapter).

210 Limitations — None

220 Diskette 110
Job E, Page 3
110-E-3

Attachment G

Reprint of the Kirman, Goldberg Article

Distance Education: Teacher Training Via Live Television and Concurrent Group Telephone Conferencing

Joseph M. Kirman and
Jack Goldberg

A tool is now available to help train teachers through distance education. The combination of one-way television with group telephone conferencing provides a way of reaching teachers scattered in different locations using one instructor operating out of a central location. Recent research at the University of Alberta's Faculty of Education has shown that this mode of operation appears to be as effective as face-to-face instruction.

Through the use of land-based television in conjunction with long distance telephone conferencing, or the use of communication satellites having one-way television and two-way telephony, teachers scattered across vast areas, or even sprinkled throughout a congested urban environment, can be conveniently reached for instruction or meetings. Previous procedures utilized either one-way television, without immediate communication with the instructor, or telephone lecturing to large groups assembled in one place.

In this new procedure, teachers assemble in small groups at conveniently located centers. Often, their own school or one nearby can be utilized. All that is needed at the location is a television set and a telephone equipped for group discussion. Such a telephone does not have to be hand-held, and the teachers merely talk in its direction. The teacher centers receive the same television image and see and hear the instructor. The instructor also has a similar group discussion telephone. At any time, the participants can interrupt to ask questions of the instructor, or the instructor can call for questions or comments. All centers receive the telephone sound, so that others can also comment on the questions if they wish. In fact, people in different centers can cross-question each other or challenge comments made by their colleagues, much the same as in a classroom with face-to-face instruction.

Joseph M. Kirman is Professor, Department of Elementary Education, and Director, Project Omega for Research in Remote Sensing Education, University of Alberta, Edmonton, Alberta, Canada. Jack Goldberg is Associate Professor, Department of Educational Psychology, and Research Associate, Project Omega.

Preparations Necessary

For the land-based television-conferencing procedure to be utilized, the school board must make provisions for television transmission through either local cable companies or television stations that provide some time for community service. This would be the least expensive procedure. Arrangement has to be made with the telephone company for the conference calls, as well as for rental or purchase of the group discussion telephones. Consideration also has to be given to possible need for additional telephone lines to be installed in the teacher centers. This may be a need where an inservice program or meeting will tie up the only outside telephone line available to a school.

If a communications satellite is to be used, the proper agency controlling the satellite must be contacted in order to obtain time on it. If this is feasible, then arrangements must be made for the necessary uplinks with the satellite. Given the variety of satellites, the general procedure is to have receiving antenna dishes of the proper size for the type of transmission desired. If the Hermes satellite is to be a heuristic guide for this, then a television-telephone uplink requires a larger dish than a telephone uplink alone. The point of transmission requires the uplink transmitter to have a direct line of sight with the satellite, and it must be at a high enough angle to avoid creating a hazard during transmission. The satellite transmission procedure is limited by what is called the satellite's "footprint." This is the zone that is covered by the satellite's downlink transmission. Only those centers in the path of the footprint will be able to receive the transmission. Different satellites can have different footprints.

Procedures

Assuming that the choice of communications technology has been decided upon, then the procedures used at the University of Alberta are virtually identical. Each center must have a group leader assigned to it. This person is responsible for switching on the equipment, receiving the telephone call, and making any adjustments needed on the television set. The group leader is also the spokesperson for the center's group. This spokesperson role is important to the communications phase, and allows an instructor or conference leader to address or question a particular group. Without a spokesperson for the group, the instruc-

tor can feel that he or she is speaking into a void, especially if a question is asked of a particular group. This way, the group leader is called by name, and the group is addressed in this manner. For example, the instructor may say, "Bill, are there any questions from your group?"

Since the instructor and participants cannot see the speakers from other groups, a good general rule is to have each speaker state his or her name first when speaking. Should someone wish to raise a point or ask a question, the center should also be mentioned, e.g., "Joe Doe here at Central School. I have a question . . ."

The Alberta Project

In the University of Alberta research project, an attempt was originally made to obtain time on a communications satellite to determine if one-way television with group telephone conferencing was as effective as face-to-face instruction. Unfortunately, satellite time was not available, so a back-up procedure simulating the satellite's media communication was used. This was land-line cable television with simultaneous telephone conferencing. A five-hour teacher inservice program on the use of certain maps for elementary classroom use was the topic. The subject group was 15 teachers in three different locations in a nearby town. The control group consisted of 15 teachers taught face-to-face in the city of Edmonton. To determine the efficiency of instruction, the teachers' pupils were tested on their knowledge of the maps as taught to them by their teachers. Test results clearly showed the television-group conferencing procedure to be as effective for this purpose as face-to-face instruction.*

Since the television signal could be locally viewed, the sound portion of the television transmission consisted only of music to maintain privacy for the instruction. The communication between instructor and student was via the telephone lines. Thus, the sound on the television receivers was turned down at the centers, and any outsiders tuning in the channel saw the instructor but heard only music. The music was decided upon rather than cutting off the sound altogether, to avoid outside viewers thinking that their television sets were broken or that there was a transmission problem.

Another Application

Unknown to the University of Alberta research team, Professor Morton I. Hamburg of the NYU School of Law was simultaneously exploring the use of communications satellites for course instruction. Using the Westar I satellite, Professor Hamburg transmitted a course, "Communications Policy and Law," to students at Sacramento, California's McGeorge School of Law. The course consisted of a series of one and a half-hour pretaped videocassettes, followed by a live one-hour, one-way satellite broadcast by Professor Hamburg. The students were able to interact with Professor Hamburg live, via the satellite's telephone system and by ground telephone lines when class was not in session. Professor Hamburg reported the venture to be successful based on student interest, preparation, attendance, and the teacher-student rapport that developed.

Conclusions

Between the two projects discussed, the use of either land-based television-group conference telephone or the same procedure with communications satellites is feasible for instruction purposes. In determining the cost-effectiveness of these procedures, the regular use of the technology must be weighed against the cost of transportation, expense of sending an instructor to distant areas, or bringing teachers in to a central location, as well as the factor of having someone "on the road" for a prolonged period of time if necessary.

A cost-reduction factor that should be considered is that of "dedicated" or subsidized telephone, television, and satellite time. This will depend upon the particular jurisdiction, the variety of support technologies available, such as microwave transmission, and patterns of ownership and financial resources. The important element is that if circumstances warrant, this mode of instruction does appear to work. □

This research was sponsored by Innovative Projects Fund, Alberta Department of Advanced Education and Manpower, Program Services Division.

*Research in press, *Alberta Journal of Educational Research*.

VERY interesting . . .

Where did you read that?

Why, ED TECH, of course!

Educational Technology—the world's preeminent magazine of educational media and technology.

Attachment H

"Technology in Special Education"
A Literature Review by Blackhurst and Hofmeister

TECHNICAL REPORT NO. 15

Technology In Special Education

A. EDWARD BLACKHURST
ALAN M. HOFMEISTER

Reprinted from Fourth Review of Special Education, Lester Mann and D.A. Sabatino (Eds), New York: Grune-Stratton, 1979.

Abstract

This paper is a review of the application of educational technology to the field of special education. The history and nature of the application of technology to special education is reviewed. Both the systems and hardware contributions of technology are treated.

To many special educators, "technology" is equated with equipment and hardware such as audio-visual equipment, teaching machines, and computers. As the Commission on Instructional Technology (1970) pointed out in its report to the President and Congress, such a conceptualization is inadequate. While it is true that things such as television, films, projectors, and computers are considered as components, technology is much broader than the use of items of hardware and software. As the Commission reported:

> "Instructional technology is a systematic way of designing, carrying out, and evaluating the total process of learning and teaching in terms of specific objectives, based on research in human learning and communication, and employing a combination of human and non-human resources to bring about more effective instruction" (p.19)

At approximately the same time that the Commission released its findings, Haring (1970) reviewed the application of instructional technology to special education curriculum design and concluded:

> "In the natural setting, educational technology is being applied in two ways: (1) through automated and non-automated media for display and measurement as part of the task of instruction, and (2) as a set of procedures which systematize instruction" (p. 25).

Both the Commission on Instructional Technology and Haring were reflecting distinctions developed earlier by Dale (1967), Banathy (1968), Gagne (1968), Heinich (1968), and Silverman (1968).

In 1977, after an extensive study, the American Association for Educational Communications and Technology (AECT) adopted and published a comprehensive definition of educational technology (Educational Technology: Definition and Glossary of Terms, 1977). Space limitations preclude the reproduction of this sixteen-part definition; however, the introductory sentence states that:

> "Educational technology is a complex, integrated process involving people, procedures, ideas, devices, and organizations for analyzing problems and devising, implementing, evaluating, and managing solutions to those problems involved in all aspects of human learning" (p. 1).

The AECT report goes to some length to differentiate between educational technology and instructional technology. However, it is common practice to use these terms interchangeably. Consequently, the terms will be used synonymously in future sections of this review.

Technology has been applied to many major problems in special education, with highly significant results. A summary of some of these major technological developments is presented in Table 1.

Table 1

Some Major Milestones in Technology that have Affected Special Education[1]

[1]Much of the material for this Table was abstracted from the work of Nazzaro (1977)

1808 - The precursor of braille is developed as a series of raised dots for sending military messages at night.

1834 - The braille code, using six dots, is published by Louis Braille.

1874 - The audiophone bone conduction amplifier is invented.

1892 - The Braille typewriter is developed.

1900 - The first electrical amplifying device for the hearing impaired is invented.

1913 - Printed letters are translated to musical tones for blind readers using the Optophone prototype.

1914 - The Tadoma method is developed for teaching deaf-blind children; The simplex hearing tube, which uses a funnel to catch sound, is invented.

1916 - The Intelligence Quotient is introduced with the publication of the Stanford-Binet Scale of Intelligence.

1920 - A human emotional response is conditioned by Watson in an experimental setting.

1926 - Pressey develops a teaching machine that uses programmed instruction; A phonograph audiometer is developed to identify hearing impairments.

1928 - Radios are distributed to blind citizens by the American Foundation for the Blind; Seeing eye dogs are also introduced to the United States.

1930 - A standard report form is developed for eye examinations.

1934 - The printing visagraph is developed to enlarge printed pages and put them into raised form; The Gault Teletactor amplifies speech vibrations, so that the deaf can receive them tactually; Talking Books for the blind are produced on long playing records.

1935 - The Waldman Air Conduction Audiometer is developed to detect hearing impairments.

1938 - Pitch is translated into a visual image by the Coyne Voice Pitch Indicator.

1947 - The Perkins Brailler is developed; Printing of large type books is initiated by the American Printing House for the Blind.

1949 - Speech is transformed to visual patterns by the Cathode ray translator.

1952 - Blind students use the Stenomask to dictate lecture notes while listening.

1953 - The megascope is invented to project and magnify printed material.

1954 - B. F. Skinner publishes "The Science of Learning and the Art of Teaching."

1960 - Lumsdaine & Glaser publish Teaching Machines and Programmed Learning.

1962 - Mager publishes "Preparing Objectives for Programmed Instruction."

1965 - Mobility in the blind is facilitated through the invention of the Kay binaural sensor; Studies are performed using token economies.

1966 - The Laser cane is developed for use by the blind.

1967 - The National Society for the Study of Education 66th Yearbook is devoted to programmed instruction.

1968 - A device for compressing speech to more than 320 words per minute without distortion, is invented.

1971 - The Optacon enables the blind to convert ink print to tactile impressions of letters.

1972 - A Braille writer of pocket size is developed; Kay Spectacles, which enable the blind to determine the precise location of obstacles, are developed as mobility aids.

1974 - A braille calculator is developed; Reading material can be magnified 25 times and displayed on a TV screen using the Visualtek Miniviewer; The electronic blackboard is developed to transmit writing over telephone lines for display on TV screens.

1975 - A talking calculator is developed to provide audio output; Speech synthesizers help persons with impaired speech to make spoken sentences. Spectograms of speech can be frozen on a TV monitor using the speech spectograph display; Cybercom permits the severely handicapped to communicate via electric typewriter and message board operated by speech or a pneumatic switch; Speed of recorded speech can be regulated using the Variable Speed Control Disc; Individual educational programs are mandated for the handicapped in PL 94-142.

1976 - The Kurzweil Reader translates printed material into synthesized speech for visually impaired persons; The partially seeing can enlarge ordinary printed material using the Optiscope illuminated enlarger; Auditory stimulation can be provided to some deaf persons using cochlear implants; Brain waves can be recorded during normal activity by an electroencephalograph vest.

1977 - The development of artificial limbs is facilitated by the use of computer technology; A reduction of muscle spasms for some cerebral palsied and epileptic persons can be accomplished through the implanting of electrodes in the brain.

1978 - Paperless braille is invented to store printed materials on magnetic recording tape.

Regardless of whether technological applications have involved the use of machines, or not, a common element has been the emphasis on systematic and integrated approaches to education. Nevertheless, considerable

variations can be noted in the application of many of these systematic approaches. The particular field of research in human learning that a researcher chooses to stress is usually a major source of such variation. Haring (1970), for example, reported a strong preference for learning principles based on the experimental analysis of behavior (Sidman, 1960). While in contrast, Scandura (1966) stated that some of the principles of learning theory were only of secondary importance in "real-life learning", and that the entering competencies a child has may be more important than such principles as reinforcement.

Such differences in emphases are still evident in special education today and may be associated with differing special education populations. Persons working with profoundly retarded children, where responsiveness to any environmental stimuli may be low, often stress principles of reinforcement. Those working with mildly handicapped persons, where curriculum content is more complex and pupil responsiveness to environmental stimuli is higher, may stress principles such as concept analysis (Becker, Engelman, & Thomas, 1975). However, while areas of inquiry and approaches to instruction may vary, the common element in technological orientations is that the problems of learning and education are approached in a systematic fashion, regardless of whether media hardware and equipment are involved in the implementation.

In the following review of the application of technology to special education, it will be seen that two approaches, one stressing media applications, and one stressing systems technology, are in evidence. The differences between the approaches are growing less distinct as illustrated by the fact that persons working with media are tending to stress systems procedures to guide their product development processes (Thiagarajan, Semmel, & Semmel, 1974).

Media Technology

Educational media are those non-human resources "born of the communications revolution which can be used for instructional purposes alongside the teacher, textbook, and blackboard" (Educational Technology: Definition and Glossary of Terms, 1977, p. 171). These generally represent devices (hardware) with accompanying materials (software) that are used to transmit messages (content). Some devices, however, are used primarily to facilitate communication or physical functioning and do not require special software for their utilization, as will be illustrated later.

Because of space limitations and the relatively large potential body of information that could be covered in this section, the authors have elected to limit discussion to either relatively recent developments in the media field or to those devices that have specific applications to the handicapped. Several references will be made to secondary sources that provide composite reviews in several different areas, e.g., Lance's (1973) review of media technology and its implications for the handicapped. This document, the most complete review of media technology up to its date of publication, should be reviewed by anyone interested in this particular topic.

Computer Technology

Computers are used with the handicapped for the same reason they are used with the non-handicapped, namely, computer-assisted instruction (CAI), computer-managed instruction (CMI), and information storage and management. Cartwright and Hall (1974) discussed many of these uses in a previous review. CAI has been shown to be effective with different handicapped populations (Fletcher & Beard, 1973; Goldenberg, 1977) and with their teachers (Cartwright, 1977). The increasing record-keeping and program monitoring requirements of Public Law 94-142 have also given rise to the increased use of computers for general record-keeping purposes, such as the storing and updating of Individualized Education Programs (IEP's) (Lehrer & Daiker, 1978; Marshall & Johnson, 1978). It should be noted that involvement of the computer to manage special educational records creates special problems, particularly in regard to the issue of privacy of records. Grayson (1978) noted that because the computer can store and analyze information on a scale unthinkable by manual processing, the privacy of the individual is now threatened on an unprecedented scale.

Computers have, for many years, assisted in the diagnosis and testing of special populations through the remote scoring of tests and through direct on-line interactions at terminals (MacLeod & Overhew, 1977; Suppes, Fletcher, Aonatti, Lorton, & Searle, 1973).

The use of computers as aids in the diagnosis and remediation of speech problems has been evaluated with some evidence of success. For example in diagnosis and remediation efforts, the computer can analyze a client's speech and then provide a visual display of it. This has been found to assist the hearing impaired person to assess the quality of his or her speech (Boothroyd, Archambault, Adams, & Storm, 1978; Nickerson, Kalikaw, & Stevens, 1976).

The rate of application of computers to special education has been closely linked to the rate of development of microprocessor technology. The introduction of microprocessors has significantly decreased the costs and increased the capacity, reliability, and portability of computers, and has extended their usefulness to the handicapped (Bodner, Hoelen & Zogley, 1978; Foulds & Gaddis, 1975; Nelson & Cassalter, 1977). For example, small, personal computers developed for the home computer market have been applied to the instructional and communicative needs of the physically handicapped (Scully, 1978). Additional examples of such computer applications will be provided in later sections.

Telecommunication Systems

The potential use of the telecommunication systems for delivering educational services to exceptional children and those who work with them is great. However, this potential remains largely untapped; only a few projects have been conducted to date to explore the feasibility of their applications.

Graf (1974) defined telecommunications as "all types of systems in which electric or electromagnetic signals are used to transmit information between or among points: (p. 588). The logic behind the electronic transfer of information was summarized by Wolff(1976):

"1. Information is the raw material of instruction.

2. The user should dictate the form, time, and place of needed information.

3. It is cheaper to move information to the user than to move the user to the information.

4. It is cheaper to move information electronically than any other way.

5. Most information can be stored, updated, and retrieved electronically.

6. All electronically stored information can be electronically distributed to large numbers of remote users.

7. Electronically stored and/or transmitted information can be given to the user in any electronically-related form such as cathode ray tube image, full audio-visual, computer, printout, or facsimile" (p. A 6-2).

Although assumptions 3 and 4 are probably not valid unless appropriate hardware is in place and certain economies of scale are met, the above propositions are well taken - particularly in light of the ever-increasing demands on individuals' time and current concerns over energy consumption necessitated by personal travel. With the advent of video disc, video graphics, and fiber optic technologies that will be described in greater detail in the next section, they will probably have even greater validity in the future.

Blackhurst (1978) has described the various telecommunication systems that are currently available. He has also illustrated some ways that these might be used for educational purposes. These ways will be summarized in the remainder of this section.

The most readily available telecommunication system is, of course, the nation's telephone system. This can be used for transmitting lectures, conducting interviews, audio teleconferencing, transmitting data, and for many other applications. Telephone systems have been very useful in providing instruction to homebound students (Carr, 1964). It was first used for this purpose in 1940 (Hill, 1956). In a recent review, Parker (1977) concluded that classroom instruction conducted via telephone is at least as effective as face-to-face instruction.

In the area of special education, Hershey (1977) found that in-service training related to the education of the gifted conducted via telephone produced significantly higher performance than instruction that was provided in face-to-face or contrast group instruction. Tawney (1977a) demonstrated that telephones could also be used to link various interface and instructional devices located in the homes of severely handicapped infants to a central computer control station. Computer-assisted instruction programs such as the PLATO system have also been transmitted over telephone lines (Ballard & Eastwood, 1974).

Computer conferencing (PLANET News, 1978) is a relatively new system that can be used via telephone lines. This system has only been available since 1977, and enables anyone who has a computer terminal connected to a time-shared computer network to participate. Users store messages in the computer for all persons who are participants. At any convenient time, by entering a code number, a user can query the system to determine whether there are any messages. If so, a response can be entered into the system to be retrieved at the initiator's convenience. This "electronic mail system" will have significant implications for remote conferencing and information exchange.

Open circuit audio and video broadcast systems are most closely associated with either commercial or educational (public) radio and television. For the most part, these are single channel systems that are expensive to operate and require special licensing. Obviously, if programming is to proceed over commercial channels it must have broad audience appeal. Educational programming for children, however, is frequently transmitted during school hours by educational television stations. These stations also broadcast inservice and credit courses for adults; however, these courses are becoming more infrequent and/or are broadcast at times that are inconvenient because educational stations are becoming more and more involved with the braodcast of cultural programming and programming for children. Perhaps the greatest potential of mass media for the handicapped will be its role in educating the general public in matters related to the handicapped such as was demonstrated by the nation-wide broadcast of the program, Including Me, in 1978. This program provided an overview of different exceptionalities and how persons with different disabilities could be integrated into everyday activities. The considerable potential for mass media to affect the attitudes of children toward the handicapped, has not been overlooked. Considerable emphasis has been placed upon incorporation of content related to the handicapped in children's programs such as "Mister Roger's Neighborhood" (Sharapan, 1973), "Sesame Street", and "Zoom". As Donaldson and Martinson's (1977) research also demonstrated, use of video and audio programming can also effectively influence the attitudes of adults toward the handicapped.

Community Antenna Television (CATV), which is now often referred to as cable TV, enables the provision of many TV channels (normally 20 channels in most major market systems) to the ultimate user--whether it be the individual, school, or community center. The technology also permits, in many cases, interaction by the subscriber. That is, users may transmit "upstream" back to the studio (Baldwin, Greenberg, Block, Eulenberg, & Muth, 1978). This facilitates the use of interactive audio, video, and computer utilization.

Instructional systems such as Time-Shared Interactive Computer Controlled Instructional Television (TICCIT) can be adapted for use with cable technology as was demonstrated in the New York project that provided instruction to homebound physically handicapped students (Tawney, 1976b). When used with other distribution systems, such as communication satellites, CATV holds great promise for the delivery of educational services (Parker & Riccomini, 1975).

Instructional Television Fixed Services (ITFS) is a special band of television channels reserved for the exclusive use of educational institutions. It was first established by the Federal Communications Commission in 1963 to respond to the needs of instructional television for multi-channel transmission capability at costs considerably lower than conventional VHF or UHF television. ITFS operates at frequencies higher than those used by open broadcast stations. For this reason, special antennas and converters must be installed on each building which is to receive ITFS signals. This equipment converts the transmission to signals which can then be received by ordinary television receivers. Once established, ITFS is economical to use for regional applications; it permits flexibility, repetition, and interaction; and it reserves a place in the telecommunications spectrum for the exclusive use of the licensed operator (Blackhurst, 1978). Green and Lazarus (1977) have demonstrated how ITFS can be used to assist regular class teachers with mainstreaming problems.

Communication satellite systems can receive and transmit the signals of any electronic medium (Polcyn, 1973). They have the advantage that they are insensitive to distance, can reach areas that may be blocked by terrain such as mountains, and are useful in remote and sparsely populated areas that may be ouside the range of other radio and television stations. A major barrier to the expanded use of satellites is the high cost of earth terminals and the limited availability of satellites and satellite time.

Two NASA-operated high powered experimental

satellites have been used in a variety of educational experiments (Bystrom, 1974; Morgan, Singh, Rothenburg, & Robinson, 1975; NASA News, 1974; Pal, 1976; Satellite Technology Demonstration Final Report, 1975; Schwartz, 1976). The largest of these was in Appalachia, where in-service education, including courses related to the gifted and early childhood education of the handicapped, were broadcast to persons in an eight state area (Bramble & Ausness, 1976). The great potential of communication satellites for educational purposes has received further elaboration by participants in a National Institute of Education conference (Background Papers for Conference on Educational Applications of Satellites, 1977).

The Council for Exceptional Children also demonstrated the use of satellites to relay portions of the First World Congress on Special Education from Scotland to the United States (Update, 1978). An additional application used a portable satellite earth terminal to demonstrate how satellites could be used to facilitate live, audio-visual teleconferencing among special education teachers who were separated by approximately 2,500 miles (Blackhurst, Williams, Churchill, Allen, & Siegel, 1979).

Future applications of telecommunications will most likely utilize hybrid systems that combine several technologies such as telephone, radio, ITFS, CATV and/or satellites. Nilles, Carlson, Gray, and Hanneman (1976) concluded that telecommunications is a viable alternative to moving people. Their studies supported this conclusion on the basis of energy savings attitude of participants, convenience, and student performance. However, they also concluded that the general public does not fully comprehend either the potential or the operation of such telecommunication developments.

Interface Devices

In 1960, the implications of teaching machines for educating the handicapped were described by Stolurow (1960). Shortly thereafter, Robert Glaser and his colleagues introduced the concept of the student-subject matter interface to the educational community (Glaser, Ramage, & Lipson, 1964). According to these individuals, an interface is any device that is used by students to facilitate their interaction with subject matter. More recently, such devices have also been referred to as man-machine communication systems (Kafafian, 1970) or communication end-instruments (Skinner, 1977).

Some of the implications of the interface concept for special education were illustrated by Blackhurst (1965), who speculated about various types of electro-mechanical devices that could be constructed to aid exceptional persons in their interaction with subject matter and with other individuals. It is interesting to note that many of the devices that were described in his article for potential future development are now a reality. In fact, technological advances have led to the development of interfaces that have gone beyond those that were being proposed approximately 15 years ago. Several of these will be highlighted in this section.

A major thrust of computer-related applications has been communication facilitation. Other technical aids also exist to support communication. Such aids range from the use of regular typewriters with mildly learning disabled pupils (Cothran & Mason, 1978) to complex and expensive closed circuit television systems to magnify print for the visually handicapped (Genesky, Peterson, Clewett, & Yoshimura, 1978; Inde, 1978). Two of the best sources describing communication aids are the Nonvocal Communication Resource Book (Vanderheiden, 1978) and Sensory Aids for the Blind and Visually Impaired (American Foundation for the Blind, 1978).

The present day communication boards with associated microprocessor technology (McDonald & Schultz, 1973; McNaughton, 1978; Von Bruns-Connolly & Shane, 1978) had origins in diode-transistor systems of the mid-1960's. These early systems allowed the handicapped person, through a single paddle switch, to cause a light to scan behind an alpha-numeric display. When the desired character was reached, it could be held or typed on a teletypewriter (Roy & Charbonneau, 1974).

Nelson and Cassalter (1977) reported on the use of a micro-computer linked to two pupils with communication boards, a teacher, and a voice synthesizer. The communication boards utilized "Bliss Symbols", representing speech sounds. The synthesizer stored the name of each symbol in a memory as it was selected. On command, the whole sentence or phrase could be spoken by the synthesizer. Such systems are particularly relevant for persons with severe language impairments.

A major benefit of such electronic communication aids lies in their ability to facilitate language development and language interaction. In some cases, dramatic improvements in language have resulted through their use, particularly in severely and multiply handicapped pupils whose potential had been grossly underestimated (Elder & Bergman, 1978; Kucherawy & Kucherawy, 1978). Along these lines Shane, Reynolds, & Geary (1977) have voiced a cautionary note with regard to the recent emphasis on nonvocal communication approaches for the severely handicapped, e.g., Bliss symbols. They recommend that an individual's verbal capability should first be explored carefully to determine potential for speech. They also note that it is possible to be severely handicapped, to appear nonvocal and yet still have the potential to communicate verbally.

Microprocessor-based aids for the visually handicapped have been widely heralded (Sinclair & Sanderson, 1978). A hand-held battery-operated calculator that speaks the name of each key as it is pressed is comparatively inexpensive and widely available (Brugler, 1978). The Opticon, which allows the blind person to read ordinary print through a conversion of the visual images to a tactile image and braille computer printing terminals, has received considerable acceptance (Joquiss, 1978; Ryan and Bedi, 1978). Since computers can now print in braille, information storage for the blind may be greatly facilitated. Compact and less expensive data cassettes can now serve to store information for them as opposed to the space-consuming braille volumes of the past.

One of the most interesting interface devices, which has significant implications for the blind, is the Kurzweil Reading Machine. This computer-based device converts ordinary print materials such as books, magazines, and typewritten correspondence, directly into spoken English at the rate of 150 words per minute. The user can control the device to also direct the machine to repeat or skip passages, spell out difficult words letter by letter, mark passages for future reference, and express the capitalization and punctuation in a sentence (Kurzweil, 1978).

A prototype braille information processor has also been developed for use by the visually impaired (TSI Newsletter, 1978). This

electronic "paperless" braille system is portable and will enable the user to read braille on a twenty-cell electronic tactile display rather than on paper. Thus, information for the blind may be stored on cassettes rather than on bulky braille paper. The user can also enter information into the cassette using a keyboard. A microcomputer then enables the user seeking information to automatically retrieve it from the cassette. Since the device is also an audio recorder, both braille and verbal messages can be stored. An optional visual display enables seeing persons to monitor and enter information into the system.

Galton (1977) reported on several other devices to aid the visually impaired. A cane has been developed that contains three laser beams that send out beams of light which result in auditory and tactile feedbacks if there are obstacles directly in front of the walker, a drop-off, or low hanging obstacles in the person's path. Two other systems in prototype form also hold considerable promise for the blind. One uses a tiny, battery-powered camera worn in the frame of a pair of glasses that transmits visual images to an elastic garment that fits over the abdomen of the wearer. The wearer can receive vibrations from the more than 1,000 electrodes in the garment that correspond to the visual images registered by the camera. Another such device transmits electrical impuses directly to electrodes implanted in the visual cortex of the brain. Initial tests of this sytem appear to be promising. Also available are devices to enable persons with retinitis pigmentosa to see at night.

A number of interface devices have been developed by Kafafian (1970). These include modified keyboards for electric typewriters that enable persons to use their feet, fists, or mouth to operate the typewriter. One interface uses a single control-stick for this purpose, while another has split the typewriter keyboard into two seven-key devices, each of which could be strapped to an arm of a wheelchair; Kafafian has also developed a briefcase size unit to be used for transmitting a visual display of the manual alphabet over the telephone so as to enable deaf individuals to communicate via this medium.

Devices that can be used to compress the rate of speech have been found to be effective with visually impaired children and those with severe reading problems (Short, 1972). These devices discard small fragments of the recorded speech and close up gaps in such so that there is no distortion in pitch or quality, as one might find when speeding up a 33 1/3 r.p.m. record player to 45 or 78 r.p.m.'s (Foulke, 1966).

A potentially significant interface for deaf persons is closed captioning. Norwood (1976) reported on research that showed that about 10% of ordinary television viewers find captions to be distracting. Consequently, a system has been developed that permits stations to caption TV programs and broadcast them in such a way that the captions will not appear on the screen unless special decoding devices are attached to the TV set. The TV watching of the deaf can thus be enhanced without infringing upon the TV pleasures of the hearing. Efforts are now underway to encourage TV stations to purchase the necessary captioning and encoding equipment. Decoding equipment will be available through commercial department stores.

In 1968, Sullivan, Frieden, and Cordery published a manual (now somewhat dated) that described numerous ways that the telephone can be modified for use by persons with a wide variety of physical disabilities. These modifications include use of hands-free equipment, use of microswitches, amplifiers, card dialers, and other dialing and holding aids. Using these, persons who may be disabled or restricted in their ability to travel could participate in educational programs or communicate with others through technological interfaces with the telephone system.

Several other interface devices are described in the proceedings of a conference on systems devices for the disabled (Fould & Lund, 1976). These include aids for travel, eating, communication, and numerous other prosthetic and orthotic appliances.

Sixty-one different communications end-instruments are described in a report prepared by Skinner (1977). This useful document provides a narrative description of each device, a picture, and a check sheet that classifies each device along a variety of dimensions.

Recent hardware developments in communication aids have created problems in dissemination and instructional applications. Vanderheiden and Luster (1976) have suggested that priority be given to:

1. The generation and dissemination of cumulative information on what already exists.
2. The development of projects to exemplify appropriate field uses of communication hardware.
3. The implementation of field evaluation for existing communication aids.
4. The refinement of existing aids rather than the development of new ones.

As the state of the art in microprocessing and electrical engineering continues to improve, it is anticipated that the handicapped will be major beneficiaries through the development of interfaces that will compensate for their disabilities. Several current developments would appear to have particular potential for the field of education. It will be interesting to observe the progress that will be made in these areas during the coming years.

One such emerging technology is video discs. Video disc systems represent a dramatic change in storage and flexibility over present video systems. For example, a single disc costing less than $10 could record and store the Encyclopedia Britannica using only 4% of its available capacity. Fifty-four thousand individual slides, each capable of being accessed randomly, could be stored on one side of a video disc. If the disc is used for storing motion pictures, one side of the disc will store 30 minutes of video programming. The disk's visual images can also be stored in combination with more than one audio track. For example, film (still or motion) sequences with two language tracks, one in English and one in Spanish, may be stored and accessed randomly. National marketing for such video disc systems was projected for late 1978 in the United States (Braun, 1978; Wood & Stephens, 1977). While somewhat delayed, it appears that it will soon be a commonplace reality.

Braun (1978) reported that few educators are aware of the existence of video discs and that fewer still have given any thought to how they might use systems to improve the learning environments of their students. Two of the few researchers who are investigating the use of video discs in education are Thorkildsen, Williams, and Bickel (1978). They are exploring the use of video disc technology with moderately retarded pupils.

Video graphics is another area of great potential. In the past, instructional programmers, working with computer-assisted instruction, who wished to use complex visual images, had to have the computer connected to some pre-recorded visual image system, such as a slide projector (Cogen,

1969). Such visual image systems resulted in considerably increased cost and decreased reliability of the total system. Now, through microprocessor technology, visual images can be stored and generated in the computer (Free, 1978). Although video graphics (sometimes called computer graphics) do not have the audio advantages of video disc systems, they nevertheless have considerable potential for educational applications with the handicapped, particularly with the hearing impaired and deaf populations.

Another development that will probably revolutionize telecommunications and related distribution systems is fiber optics (Whittaker, 1976). Coupled with laser technology, such distribution systems will vastly increase the number of audio messages or TV channels that can be transmitted, and also improve their quality. For example, it would be theoretically feasible to transmit the entire contents of the 30-volume Encyclopedia Britannica in a tenth of a second. A conventional pair of copper wires can handle up to 24 simultaneous phone calls, while 2 optical fibers can accomodate the equivalent of 33,000 such calls, (Powell, 1977). If these distribution systems are eventually installed, this will have considerable implications for the transmission of information through telecommunications, as discussed earlier.

Systems Technology

Gallagher (1970) has defined a system as a combination of elements functioning in relationship to each other. He has pointed out that we do not really have an educational system, according to this definition. Rather, there is an educational tradition that stresses autonomous units and self-contained operations rather than interactive, mutually responsive elements. In recent years, however, the field of special education has developed a number of sub-systems that have the potential for being integrated into a larger educational system. Several of these will be discussed in this section.

The Instructional Program

The implementation of PL 94-142 has, in one bold move, placed systems technology on center stage. The major operational component of PL 94-142 is the individualized education program (IEP) (Abeson & Zettel, 1977). While there is a variety of uses of the term "program" in education, the definition of a "program" in 94-142 is conceptually similiar to the systems technology concept of a program. This concept was stabilized in the late 1960's when the field of programmed learning shifted from its earlier emphasis on format (Hofmeister, 1971). This switch has been described by Green (1967) as follows:

> "In looking into the future, it seems clear that the day of the classic self-instructional program, as it has come to be recognized in the past decade, is almost over. We have passed through the dark ages of controversy over such matters as whether a branching program is superior to a linear program; whether an overt response is necessary to the learning process; whether it is more or less desirable to incorporate small steps into a program, and whether people are pigeons" (p. 79).

Corey, (1967), in clarifying the then new definition of an instructional program, listed the following elements; determination of objectives; analysis of instructional objectives; relevant population characteristics, e.g., entering behavior; evidence of success of instruction; and constructing the instructional environment. These elements are all present in the definition of an IEP, namely, statement of annual goals, (for determination of objectives); short-term instructional objectives (for analysis of instructional objectives); present levels of educational functioning (for relevant population characteristics); provision for program monitoring and review (for evidence of success of instruction); and statement of services to be provided (for constructing the instructional environment).

The fact that a given procedure (e.g., use of IEP's) is consistent with systems technology does not necessarily make that procedure effective. There is, for example, considerable conflict in research findings related to the use of behavioral objectives (Crutcher and Hofmeister, 1975). Stolovitch (1978), in discussing the value of behavioral objectives, stated:

> "The special education technologist has a particular mission to assist in discovering what ways, if any, instructional objectives contribute to improved learning for the handicapped" (p. 36).

The major justification for the use of IEP's appears to be ethical and legal, and a substantial program-specific research base does not exist. In researching the impact of IEP procedures on math achievement with the mildly handicapped, Boehmer and Hofmeister (1979) were able to show gains in favor of IEP users versus nonusers. The range of research possibilities in this area has been somewhat reduced because the use of control groups of handicapped pupils would now be a violation of federal law.

A major contribution of the implementation of systems technology into classroom procedures will be the potential for blending research and practice (Lovitt, 1978). Instead of confining research procedures and projects to the researcher, the techniques advocated by Lovitt stress the involvement of the classroom teacher in the search for data to validate and modify classroom practices.

The Instructional Package

The Commission on Instructional Technology (1970) noted that technology does not have to move people, it transmits the impact of people. One of the vehicles used in instructional technology to transmit impact is the instructional package. In reporting on the development and validation of a mediated package for training parents of preschool mentally retarded children, Hofmeister and Latham (1972) recommended the use of mediated training packages as being worthy of further study as a practical method of treatment well within the resources of many agencies.

A learning package has been defined as a systemized way of delivering content and processes to a learner (Kapfner & Kapfner, 1972). The term, "package", implies a self-contained and portable system. Most packages can, in fact, be sent through the mail. A package may consist of printed materials alone; however, many include slides, cassette tapes, video-tapes, and films (Stowitschek & Hofmeister, 1975). Blackhurst and Wright (1978) illustrated how systematic computer approaches could facilitate planning for the development of instructional packages. Aside from portability and systemized development and delivery of content and process, a special education package must be validated for a given population of handicapped persons. Only after validation with a specific target population should the terms "packaged program" be applied in the strict instructional technology usage.

The approach to packaging that is having the most extensive impact in special education is one which stresses the use of relatively low cost printed materials that give precise and

practical instructions for teaching specific skills to given populations of handicapped learners. Such packages achieve considerably more generalizability when they are validated for use by paraprofessionals and parents (Thiagarajan, 1975). Examples of such packages include the Training for Independence Series. (1977), published by Developmental Learning Materials, and the Project MORE Series (1976), published by Hubbard.

Competency Based Teacher Education

One of the most significant forces that has affected special education personnel preparation during the 1970's is competency based teacher education (CBTE). Blackhurst (1977) described a model for developing CBTE programs in special education and listed characteristics of such programs as follows:

1. Competencies that are required for any professional preparation program are publicly stated.
2. Objectives for the various educational experiences are stated in behavioral terms.
3. Criteria for evaluating when objectives have been met and competencies attained are specified and made available to students.
4. Alternative learning activities and multiple entry points are available to individualize the instructional program for students.
5. Where possible, time for completing instructional activities is variable, while achievement is held constant.
6. Instructors and students both share accountability for performance.

The parallels between these conceptualizations and those in the section of this review related to instructional programs for children should be obvious. Similarly, CBTE programs make considerable use of instructional packages in their delivery of the instructional program.

Implicit in competency based approaches to teacher education is the obvious notion that students must have the opportunity to demonstrate the competencies that they have developed. Consequently, most CBTE programs have rather extensive field components.

Considerable efforts have been expended to identify and specify competencies for various special education roles. These have included teachers of the educable mentally retarded (Rotberg, 1968); special education curriculum consultants (Altman & Mayan, 1974); teachers of the secondary level educable mentally retarded (Brolin & Thomas, 1972); special education supervisors (Harris & King, 1974); directors of special education (Anderson & Schipper, 1974); directors of special education resource centers (Blackhurst, Wright, & Ingram, 1974); clinical teachers (Schwartz & Oseroff, 1975); special education professors (Ingram & Blackhurst, 1975); teachers of children with learning disorders (Blackhust, McLoughlin, & Price, 1977); teachers of the gifted (Altman, Faherty, & Patterson, 1978); teachers of the severely handicapped (Fredericks, Anderson, Baldwin, Grove, Moore, Moore, & Beaird, 1977); teachers of the learning disabled (Newcomer, Magee, Wilson, & Brown, 1978); and elementary teachers involved in mainstreaming (Redden & Blackhurst, 1978).

Although these competency lists have some face validity, it should be emphasized that most have not been validated from the standpoint of whether they in fact make a difference. As Shores, Cegelka, and Nelson (1973) noted, this is one of the major tasks facing intructional designers who are involved with CBTE.

Once competencies and objectives have been developed, instruction can be delivered in a variety of media and formats. In addition to instructional packages that were mentioned in the previous section, an array of alternatives has been used. Among these are computer-assisted instruction (Cartwright & Cartwright, 1973); gaming (Semmell & Baum, 1973); videotapes (Currie, 1976); microteaching (Shea & Whiteside, 1974); automated teacher feedback systems (Semmel, 1972) adjunct autoinstruction (Renne & Blackhurst, 1977); alternative mediated formats (Donaldson and Martinson, 1977); modules (Blackhurst, Cross, Nelson, & Tawney, 1973; Wixson, 1975); multiplier effect models (Meyen, 1969); change agent models (Anderson, Hodson & Jones, 1975), and contingency management systems (Tawney, 1972).

As Blatt (1976) has demonstrated, not all special education professors are supportive of CBTE. Nevertheless, more and more states are moving toward competency based teacher certification and federal funding for training grants is contingent upon proposals that reflect competency based programming. In addition to the references mentioned in this section, the interested reader will find comprehensive treatments of CBTE in special education in Creamer and Gilmore (1974), Blackhurst (1977), Semmel, Semmel, and Morrissey (1976), and the single topic issues of certain journals that are completely devoted to the topic. These include:

Behavioral Disorders, Vol. 1, No. 2, 1976
Teacher Education and Special Education, Vol, 1, No. 2, 1978
Journal of Teacher Education, Vo. 29, No. 2, 1978

Technical Assistance Systems

In the 15 year period since 1966, various technical assistance services have been available to special education teachers, administrators, and project personnel. Largely supported by federal funds, these services have ranged from the loan of instructional materials to computer-based information storage and retrieval. Originally, these services were provided by special education instructional materials centers (SEIMC's). A special feature issue of Exceptional Children (Vol. 35, No. 3, 1968) provides a good overview of the original SEIMC Network.

Shortly after the SEIMC's were established, Regional Media Centers for the Deaf and an instructional materials reference center for the visually handicapped were added to the Network. A National Center on Educational Media and Materials for the Handicapped (NCEMMH) was also added (LaVor, Forsythe, Wexler, Duncan, & Milenson, 1969). Lance (1973) has written an overview of all of these projects and their services.

In 1974, the federal program that supported these various projects was reconceptualized. Within the program, Area Learning Resource Centers (ALRCs) were developed which provided technical assistance on media and materials and; Regional Resource Centers (RRCs) provided aid in diagnostic and prescriptive programming, with several special offices dealing with materials development and distribution. Coordination was provided by the NCEMMH, and the Coordinating Office for Regional Resource Centers (Blackhurst, 1974).

Another federal program shift occurred in 1977 with the special office, ALRC's, and CORRC being eliminated. The RRC's were relocated and took on the responsibility of providing tech-

related to the implementation of PL 94-142. These included information storage and retrieval services for professional literature (CEC Overview, 1978) and the availability of instructional materials on a national basis (Risner, 1978). Other technical assistance services have been available to support the efforts of early childhood special education projects, developmental disabilities projects, gifted and talented projects, leadership training projects, and others (Reynolds, 1974).

Although the various Federally funded projects have provided many valuable services to the field, the potential for the development of a national special education network that could provide services on a coordinated basis was never fully realized. This is due, in large part, to the number of switches in program emphasis that have been made as well as an absence of a well-defined federal policy related to the development and operation of such services that was acceptable to top-level administrators. One of the long term benefits that accrued from these projects is the existence of approximately 800 local centers, providing technical assistance of various types to special educators located in different size geographic regions within the various states. These were primarily developed because of the efforts of the Regional SEIMC's. Several information storage and retrieval systems are also now available as a result of developments in the original network of Centers (Lance, 1977). A technology of technical assistance is another emergent and is now being continued and refined by such agencies as the Technical Assistance Development System (Clifford & Trohanis, 1976).

Perhaps one of the most significant outgrowths of these federal technical assistance programs has been the development of a cadre of professionals who have acquired interest and competence in applying technology to the field of special education. In fact, as a result of impetus, primarily from persons who were involved with these earlier projects, a new professional organization was developed. The Association for Special Education Technology (ASET) was organized as a national affiliate of the Association for Educational Communications and Technology (Cotzin, 1973). The major goals of this association are to:

1. Facilitate improvements and adaptations of materials for special education.
2. Stimulate development of new technologies for special education.
3. Identify and publicize unique instructional needs of special education.
4. Foster cooperation among special education and instructional materials.
5. Encourage development and production of effective special education materials.
6. Promote improved federal legislation for technology in special education.
7. Assist in placement of instructional technologists in special education.

In 1978, the first issue of the Journal of Special Education Technology was published by this organization to serve as the major vehicle for communicating professional literature relevant to these stated purposes.

Barriers

Lance (1977 stated that the field of instructional technology has made more progress in the development of systematic approaches to instruction than in the use of non-human resources to improve education. He concluded that the gap between technological invention and adoption is due to several factors: (a) Educators are conservative and view technology as too risky (b) Technology is perceived as a threat to jobs and personal interactions with children; (c) Costs are too high; and (d) The vehicles for bridging the gap between the development of technology and its implementation are yet to be fully developed.

In addition to these, the following barriers to the implementation and greater use of technology were identified by some 57 experts who attended a national conference on technology in special education (Blackhurst, Williams, Churchill, Allen, & Siegel, 1979):

- User needs for which the applications of technology have the greatest relevance have not been adequately defined
- There are insufficient data which compare the effectiveness of programs delivered via machine and face-to-face programming.
- Initial start up and hardware costs are usually high.
- Systems using telecommunications are most cost-effective when economies of scale have been realized.
- There is a paucity of information concerning cost-effectiveness.
- Good software is expensive and time-consuming to develop.
- There is a shortage of personnel who have the experience or education to provide quality programming.
- Many decision makers and potential users have negative attitudes toward technology.
- Equipment manufacturers are frequently not interested in working with educators because of perceived lack of profitability in educational enterprises.
- Local authority is threatened when others develop curriculum content and control the delivery system.
- Political and geographic boundaries frequently militate against the development of large scale cooperative efforts.
- Insufficient channels are available when using most telecommunication systems. Regulation and licensing of these also impede the development of additional ones.

It should be noted that these barriers represent opinions and are not necessarily valid or based on empirically-verified data. However, they do represent the thinking of many professionals who have been involved in educational technology. If there is validity to any of these perceived barriers, then it is obvious that they will need to be overcome if broader applications of technology in special education are to be realized.

Conclusions

Even in light of the aforementioned barriers, this review has prompted the authors to conclude that technology has played a valuable role in the education and habilitation of exceptional people and has the potential for playing an even greater role in these respects in the future. Gough (1968) has suggested that

technology can and does contribute to the solution of many problems associated with deficiencies and limitations in educational services for the handicapped. More recently, Lance (1977) has predicted an even greater utilization of technology in order to (a) facilitate the integration of handicapped children into the least restrictive environment; (b) help meet the needs of the severely handicapped; (c) compensate for physical and sensory impairments; (d) manage the development and implementation of IEP's; and (e) respond to pressures to improve the educational system.

One additional concluding point should be emphasized. Namely, that the great majority of the sources cited in this review represent descriptive articles. In general, there has been a paucity of research that has specifically attempted to assess the effectiveness of different technologies or their employment as alternatives to other approaches. Many of the conclusions that have been drawn concerning the application of technology to the education of the handicapped have been based upon logic, more than empirical data. Future efforts should be devoted to the development of empirical data. Future efforts should be devoted to the development of empirical studies that can be used as the basis for decision making relative to the development and use of the technological alternatives in special education.

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Attachment I

Havelock's and Lindquist's Implementation Model

Function 1. Arousal and Articulation of Audience Needs

It is "disturbances" which drive the planned change process. Many needs exist at any one time in any one audience. Things are not going right, or as right as they might, for many people much of the time. The challenge is to arouse enough attention to certain needs, and to articulate them strongly enough, that those who could develop solutions to those needs take notice.

Funders and practitioners of D&U tend to regard this need arousal and articulation as none of their business. It is a matter far prior to model program dissemination. The linkage model suggests that such thinking is in error. Without a careful needs assessment process, researchers and developers only can guess what to generate or disseminate. We urge D&U leaders, therefore, to borrow a chapter from organization development and clinical counseling: begin with a systematic inquiry into just what a potential audience may need in order to live its life more effectively. Particular tactics might vary from sponsoring a national conference or series of studies on the plight of Native Americans to an interview/survey investigation of one hospital's problems in nursing care, or financing an expert to live with her audience before and during research and development so that she experiences her audience's needs and situation firsthand. On whatever scale needs assessment is done, however, the objective is the same: to arouse and articulate actual needs for change.

Function 2. Communicating Needs to the R&D Community

Researchers and developers may be the last persons to see that their services are needed in order to create an effective response to a particular societal problem. Often the problem, say urban decay, is too general in its articulation to suggest to any particular scientist or developer that what is needed is an innovation. Often, those suffering the decay do not, themselves, see that R&D might help. So audience members go on griping while experts go on developing non-solutions.

What is needed is close interaction between innovation audience and development, from the beginning. We believe that the best time to start D&U is at the beginning of R&D. Funders might support audience members (e.g., students, patients, Indians, welfare recipients) as they try to explain to the research and development community just what needs improvement. Funders also might support R&D people in learning how to sense just what their audience is telling them. Because of the lay-specialist language gap, this two-way communication tactic may be, in part, communication skills training in listening and speaking. In our example of the learning module project, the module developers would learn how to listen to teachers and students, who would learn how to express their needs to these experts.

Function 3.
Design of Relevant R&D

Funders traditionally enter the R&D picture at point #3 on Figure 2. Once a problem area gets aroused and communicated, say the need to create new models for basic skills instruction or for rural health care, funders announce research and development grant competitions in such areas. Or, without their announcement, they get innundated with proposals from the R&D community to support this or that new model's development.

At this point, dissemination and use already should be an active concern if close relation of model to audience is a funder's or developer's aim. Certainly researchers and developers should have important influence over the shape of their work. They are the experts. But if they do not collaborate with their potential audience during R&D itself, there is weak assurance that the messages communicated to them will be accurately reflected in the models they build.

What is disseminated at this point is not the final product. Dissemination is not just broadcasting the model. The D&U task during the planning of R&D is to get audience contribution to and feedback on those plans. If we developers create these learning modules on these topics this way, are they likely to be useful to teachers and students? The nice side effect of such collaboration in planning R&D is that the audience joins the effort and therefore feels somewhat invested in the model.

Function 4.
Scientific Problem-Solving

Research is separated from development in most academic communities, although R&D laboratories attempt a close relationship between the two. Havelock's model here reflects that traditional separation, and it seems an accurate representation of most approaches to the research which might lead to development.

Here the D&U funder or practitioner usually is uninvolved. Research is prior to dissemination in Figure 1's linear sequence. We believe, however, that there are several ways in which scientific problem-solving should be a D&U concern. One is that dissemination is not just of a model but of the research lying behind it. Disseminators can dig up that research when preparing their presentations; a better way is urging researchers to keep one eye on their practitioner — as well as their scientific audience — when conducting studies.

Another way research and dissemination can be mutually supportive is to regard research as part of dissemination. Researchable questions arise during dissemination and use. If funders and disseminators can turn researchers to those questions at this stage in the game, answers may unblock resistance. Say a nursing procedure, already researched and developed, works for an audience in all but one way, a physician's reluctance to authorize such a procedure because it contradicts an accepted medical assumption which earlier researchers had overlooked. Now, during utilization, new basic and applied research into the reasons for that reluctance is needed.

Yet another way research is part of D&U is that D&U can be research. It can be systematic study, basic as well as applied, into the reception and effectiveness of a hypothesis, namely that this innovation does solve problems in various settings. Although technological innovations such as new aircrafts often can be tested against all kinds of conditions in a laboratory, even then it may take actual commercial flights to learn whether those tests hold. Many non-technological innovations, such as teaching or leadership strategies, are especially dependent upon utilization variables which cannot be controlled in laboratories. The leader and the situation are the two factors most obviously important and difficult to control. For them, utilization is the best time for scientific problem-solving. Unfortunately, most D&U projects include only a little evaluation money and time. Rarely is systematic research into the model's utilization a strong concern of D&U funder or leader.

Function 5.
Development of Models for Practical Use

Research suggests that adults initiate many learning projects each year and use several peers to assist them in each project (Tough, 1978). Adult students therefore can be described as "peer-assisted, self-directed learners." But of what use is this research to educators of adults? Transforming such research into models for practical use is a key function in planned change, and one about which many foundations and federal agencies are especially concerned.

Funders can support the summarizing and synthesizing of such research so that busy practitioners can grasp it quickly.

They can fund the translation of such research into practitioner language and settings. They can fund experiments or demonstration projects which create models or examples of how practitioners can use the research. They might fund the packaging, labeling, simplifying and engineering which can make some such models less expensive and more capable of easy use.

All these Function 5 activities are familiar to the contributors to this book, for these are model program funders and leaders. But how might model program *development* be done as D&U? Some would say, following the linear sequence and separate specialization assumptions, that D&U is done *after* development (for until then how will we know the model is worth disseminating) and *separately* from it. We argue, once again, that such thinking is self-defeating.

If one's audience is not brought into the picture until the model is developed and evaluated, it is guesswork whether the model does fit the audience. Our learning modules might have been used if the students and teachers who were to use them had collaborated in their development. Also, this involvement increases audience understanding of the research and theory behind the model, of the difference between this model and alternatives the developers rejected, of how to design and implement such a model. All these subjects traditionally are taught during dissemination to a hitherto "cold" audience. If learning occurs particularly well through active inquiry and problem-solving rather than passive reception of instruction, getting one's audience involved in model development is one of the best strategies for getting a model used. And, to confront the worry about premature dissemination of models which should be left on the shelf, what better safeguard than to let an audience discover for itself what does and doesn't work (while helping to overcome weaknesses in the model)?

There are many ways to engage one's audience in model development. One is to sponsor events at various stages of development on topics such as the following: problem clarification, planning, design, training, testing, refining, packaging. Audience members (at least a small, representative sample) can learn in these events what is developing and can critique these activities from a potential-user perspective before it is too late. Another involvement device is to have a development advisory board composed of potential users. Another is to poll one's audience during development and to share with it the developer's research, theory, other models and emerging thinking so that audience and developer learn together. These activities need not be costly and overly time-consuming. But funders and

developers would have to spend more money and time connecting development to potential users than most do now.

Function 6.
The Dissemination of New Models

If other functions have involved the audience as we suggest, much dissemination already is occurring. One's audience is already warmed to the subject.

Traditional planned change models represent research and development as the key specialties, and most of the money and status do flow in those directions. Indeed, dissemination often is simply the last act asked of the researcher (through scholarly articles and conference presentations) or developer (through more practical handbooks and technical assistance in utilization). It is also the least supported act in time and money spent by foundations and federal agencies, in contrast to the vast amounts private enterprise pours into dissemination (marketing and sales). The assumption seems to be that one's audience is interested, knowledgeable, easily able to implement the model (not just technically but also politically) and passive. It is just waiting for the answer. And the researcher or developer knows just how to give that answer to that audience. What a mistake!

Slowly, funding agencies and D&U practitioners are discovering what the Cooperative Extension Service learned long ago regarding dissemination and use among farmers. Most members of one's audience, no matter how educated and seemingly progressive, are likely to be unaware, uninterested, unskilled and just plain too busy to pay much attention to your so-called solution to their problems. If R&D is worth funding and doing, D&U is worth doing thoroughly as well.

Let us rehearse the dissemination strategies already under way by the time Havelock's Function 6 is formally launched, if our advice has been taken. Assessment of audience needs has occurred. Foreseeing dissemination, that assessment might include study of who talks to whom; of how innovations previously entered that audience; of audience norms, values, structures (of political influence, of administration, of buildings); and of other things a disseminator will need to know in order to intelligently introduce new ideas to that audience.

Prior to dissemination, a strong interaction between audience and researcher, audience and developer, will have

been established. This interaction will have increased chances that audience needs are accurately translated, that new research and development speak to those needs and relate to the audience's situation, that at least some audience members have increased their knowledge, interest and skill in the innovation. Dissemination-and-use funders or leaders should be cautioned against unwarranted optimism that such involvement, no matter how ably and amply done, has created that ready and eager audience as a whole. A few converts and local advocates, yes; widespread awareness, interest, and ability, most unlikely.

What must take place at Function 6 is much more extensive audience-developer interaction. Chapter Two outlines three types of that interaction: one-way communication from disseminator to audience, as in publications, speeches and training workshops; two-way communication of disseminator with audience, as in participative workshops and consultations; and disseminator facilitation of local adaptation, the type closest to actual use (and actually Havelock's Function 7). This book discusses and presents examples for each of these types.

Here we wish to raise the Cooperative Extension Service model to greater visibility as a long-range D&U funding or leadership strategy. The idea is to establish a local "linking agent" who gets to know her audience as well as possible and helps it assess its own needs, gets to know resources (including information on model programs) which might help her audience's problem-solving as much as possible, shares those resources in ways which increase audience awareness and interest, and then facilitates audience use of external resources in solving local problems. A combination communications expert and problem-solving facilitator, with sound grounding in the topic area, is needed. It is not an easy role. Without it, however, close linkage of development and audience is unlikely. Many promising — and expensive — innovations go unused.

Function 7. Insuring the Use of Disseminated Models

Recent innovation theory is arguing a point which students of community power and complex organizations have argued for years. That decision by a few audience members,

even though they are the highest authorities, to use a model program is a long way from actual use. Few local members may have heard of the innovation, despite their organization's pledge to implement it. Local understanding, interest and ability probably can be strengthened, but the effort usually will require time, money and skill not included in most D&U packages.

As important as local orientation to the model may be the model's orientation to its new setting. The need for two-way orientation is why Berman and McLaughlin call their model for innovation "Mutual Adaptation" (Berman and McLaughlin, 1975). Many adjustments may be needed in order for the model to fit local concerns, local structures, local talents, local norms and values. Unless D&U leaders assist in this adaptation process, the model may be rejected during implementation when it could have been highly useful in adjusted form. Perhaps a key element in this adaptation process may be increased ownership by the audience of the innovation as *our* solution to *our* needs rather than a bill of goods sold us by outsiders.

There are many healthy aspects of reinvention. Of course, disseminators will need to be wary that a model is not misused in dangerous ways. They will need to continue to promote and protect the essential features of their model. But most innovations have far less which is essential to their integrity than their inventors may believe. There are dozens of ways to individualize education. If the general idea and some basic tenets are disseminated along with one or more specific models, chances are an audience of professors can make a pretty fair adaptation.

There are at least two external D&U roles which seem to us vital to Function 7, actual use of innovations. One is the specialist in, and advocate for, the model. That role needs to be filled in order that audience members learn how to use the model and how to avoid snags in implementation while they continue to be attracted to the model's good features. Without such a specialist, the model can fall quickly into disfavor and disuse. The second role is adaptation facilitator. This role is audience- rather than model-centered. It seeks to enable the audience to diagnose needs which the model might meet, to assess alternatives to the model, to formulate locally appropriate adaptations of the model, to reduce local resistance and increase support, to implement and evaluate the adaptation. Lindquist, Johnson and Schneidmiller argue in Chapter Fifteen that disseminators need to be both persuaders and facilitators. We agree here that linking agents will need to play both roles

Function 8. Practitioner Problem-Solving

The role of adaptation facilitator is only a step removed from that of the problem-solving facilitator who helps audience members to create their own solutions largely out of their own resources. Some funders and change agents go straight to the practitioner as the source as well as the audience of innovation. Who better can develop those learning modules than the adult students and teachers who need them? So college staffs without specialized R&D training are given grants to create models for individualizing education. So nurses who also have no background in specialized R&D are supported to generate new ways to nurse. So, indeed, many of our most widely used innovations have been created by practitioners to solve their own local problems.

We do not decry this emphasis on local problem-solving as a strategy for generating innovations of potentially widespread applicability. Indeed, Lindquist's "Adaptive Development" model varies from linkage particularly in viewing innovation in postsecondary educational practices, at least, as products mainly of local problem-solving. This local generation is stimulated and guided by external models, certainly; but often those models come from other practitioners, not from specialized R&D. Adaptive development suggests to D&U funders and leaders that, far from being the last and most easily neglected aspect of D&U, local problem-solving within one's audience may be the first and foremost thing to facilitate.

We do, however, register two cautions. One is caution that these practitioner-generators maintain close contact with their own potential audience just as the R&D community should. Committees or pilot projects too often develop their programs in isolation, only to find that their local audience is as cold as a national audience may be to R&D specialists. Meanwhile, other practitioners are likely to say, "That may be fine for your place, but we're different." Such differences, real or imagined, should be the subject of early and continuing interaction between practitioner-generator and practitioner-audience. All of our Figure 2 discussion applies. Just insert "Practitioner-Generator" for "R&D Community" as the left-hand circle.

Our second caution is against forgetting that there is a research and development community. Local problem-solving can benefit from prior scientific inquiry. It can benefit from developments generated by R&D experts as well as by fellow practitioners. Without such linkage to R&D, local developments may waste much energy and make costly but avoidable mistakes.

At base, Function 8 is a challenge to increase within any audience the ability to diagnose problems, formulate solutions, decide, implement, and evaluate. It is further, a challenge to conduct such problem-solving with sensitivity to others who might benefit and with effective use of available knowledge resources. This challenge might be the central, and should be the secondary, mission of any D&U funder or leader. The key question becomes, "How can we support the use of innovations in such a way that the innovation's audience increases its ability — and desire — to solve its own problems in close interaction with the broader scientific and lay communities?"

A Dissemination and Use Checklist

If a D&U funder or leader wishes to increase the impact of a model program's developments, the best advice of traditional thinking would be to regard dissemination as a single step following a linear sequence from specialized research and development. Our reading of planned change theory and practice suggests that the assumption of a neatly linear and separately specialized sequence should be abandoned in favor of an interactive set of eight functions. These functions become a dissemination and use checklist for D&U funders and leaders. Figure 3 has that checklist.

Figure 3
A Dissemination and Use Checklist

Function	D&U Funding Priority (1-8)	D&U Funding Currently Practiced (✓)	D&U Practice Priority (1-8)	D&U Practice Currently Practiced (✓)
1. Arousal and Articulation of D&U Audience Needs				
2. Communicating Audience Needs to the R&D Community				
3. Design of Relevant R&D				
4. Scientific Problem-Solving				
5. Development of Models for Practical Use				
6. Dissemination of New Models				
7. Ensuring the Use of Disseminated Models				
8. Practitioner Problem-Solving				

Attachment J

Telecommunications in Rural America:
Special Population. Special Problems.

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TELECOMMUNICATIONS IN RURAL AMERICA:

SPECIAL POPULATIONS

SPECIAL PROBLEMS

Submitted to
National Institute of Education
by
Public Service Satellite Consortium
Louis A. Bransford
July 8, 1980

Telecommunications in Rural America

July 8, 1980

by Public Service Satellite Consortium

Abstract

The disproportionate shortage of health, education and other public services in rural areas is a national concern. In his State of the Union Message, sent to Congress in January 1979, President Carter emphasized the need to address the pressing problems of rural America. In his message, the President pledged to help rural Americans to:

- overcome the problems of isolation;
- promote economic development;
- meet basic human needs;
- protect the quality of rural life;
- assure equity in the administration of Federal programs for which rural Americans are eligible; and
- build a more effective partnership among Federal, State and local governments and the private sector in meeting locally defined rural development priorities.

Telecommunication technology is now being applied on a regular basis to better serve the information needs of people in the fields of entertainment, education, health, government, business and industry. The impact has also been felt by special populations: the aged, the handicapped, the gifted, the linguistically different, the migrants and the veterans. Inject a rural element, however, and the needs and problems are compounded while services diminish.

It is unlikely that telecommunications will be utilized extensively in rural America in the absence of fundamental organizational changes. Use of appropriate labor-saving technology probably would result in productivity gains, but first there must be coordinated planning and agreement on the basic objectives which are to be addressed in the public service.

New alternatives for better serving rural communities must be sought. Only through increased use of telecommunications can equal opportunity be extended to all Americans on an economical basis. The national commitment must be met. Platitudes and good intentions no longer suffice. Innovative ways to resolve the critical issues impacting on rural America must be pursued. The need to upgrade programs and services in rural communities is rapidly moving toward a critical juncture. A rural telecommunication network could be the equalizer.

July 8, 1980

by Public Service Satellite Consortium

Introduction

The decade of the seventies witnessed technological advances in the U.S. which vastly increased productivity in almost every area of human endeavor. The momentum for change was felt throughout but a void remains in rural America. Rural communities, even those with new found prosperity, continue to be technologically undernourished.

The late Peter Goldmark envisioned the creation of a "wired nation" by 1980 that would bring urban centered events to rural America. Dr. Goldmark visualized satellite transmission of health, educational, business communications and other information services that would revolutionize rural America. It hasn't happened.

Few argue that new technologies in telecommunications offer significant possibilities for improving the living conditions of rural Americans. These technologies have the potential not only for providing rural households with more entertainment and public affairs programs, but also for alleviating some of the serious problems inherent in the delivery of education and health services to rural communities.

In Alaska, for example, it has been demonstrated that in emergency situations, paraprofessionals can use telecommunications for obtaining guidance from physicians--guidance which would otherwise not be available. One radio physician team can consult and direct as many as 50 paraprofessionals, each of whom could oversee separate villages of 100 to 200 people.

Advanced education and health-related technologies are in the early stages of development. The emphasis continues to be on demonstration, and as a result has not been available to the public on a general basis. In fact, most rural communities including those in Alaska have never been exposed to new advances in telecommunications in any significant sense (significant defined as continuing operational services).

In most cases where efforts have been made to improve services to rural areas using telecommunications, a government agency has footed the

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bill. Low population density has made the development of telecommunications in rural areas relatively unattractive to profit-oriented firms.

Excluding, for a moment, consideration of rural America, the use of communication satellites for delivery of programs and services is very much a reality. The $50 billion plus investment in the space program is now being applied on a regular basis to better serve the information needs of people in the fields of entertainment, education, health, government, business and industry. The impact has also been felt by special populations: the aged, the handicapped, the gifted, the linguistically different, the migrants and the veterans. Inject a rural element, however, and the needs and problems are compounded while services diminish.

When we speak of rural populations, we generally think of communities with populations under 2,000, based on census criteria. However, any analysis of ruralness must include such factors as limited accessibility to conventional modes of transportation to population centers and limited accessibility to communications systems.

Television in rural areas is a good example. Though 98% of all American households receive at least one television channel, as many as 1.2 million rural households are outside the broadcast areas of conventional TV. Those rural families who do receive television programming overwhelmingly receive less than the urban share of channels. A large majority of rural households (14 million, 70%) receive three or fewer channels. By comparison, 65% of all households, mostly in urban areas, receive five or more channels. Overall, including service from translators and cable, the typical rural household receives 50%-60% of the television signals received by urban households. Public television is usually what rural communities don't receive.

Ironically, the low population densities and attendant social service needs make the use of telecommunications in rural areas attractive, particularly in the areas of education and health. It's exciting to talk about, but difficult to implement. This situation is further complicated by the exodus from cities to rural areas. Since 1970, population growth has been greater in rural areas than in urban areas of the U.S.

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An interesting observation is that many designated rural areas are in reality bedroom communities for a metropolitan community. In an attempt to escape the plight of the city, for a variety of reasons--busing, smog--families with means are able to live in rural communities while continuing to work in the city. Although their property taxes support the rural schools, this sudden influx has created a burden on existing facilities. It has also presented problems for the schools because the demand for services that were available in the city are not available in rural districts. The focus of this paper, however, will be on rural isolated communities not on bedroom communities designated as rural.

An important dimension of the increased demand and concomitant burden on community facilities is the fact that the median age of the population in growing rural communities is almost two years less than declining communities. Thus, more families with younger children (who will attend school for a longer period of time) are moving into rural areas.

Ironically, large numbers of families that have moved to the country to get away from the city experience a different type of trauma in the transition and ultimately migrate back to suburbia. The rural poor do not have this option.

Rural Telecommunications Network

Why not a rural telecommunications network? In a very simplistic sense a rural satellite network would be feasible if the demand for a specific set of communication services was sufficient to induce a commercial supplier to offer the proposed combination of services at the right price. It does not require another feasibility study to determine that in rural areas, the demand cannot overshadow the price of development. Fewer voices coming from rural America translate into bad potential market surveys.

Rural Telecommunications Network. . .

At the present time, no common carrier appears prepared to provide comprehensive broadband service to rural America. The Bell System now serves 80% of the U.S. population and about 40% of the U.S. geography. Some 1300 independent telephone companies serve 20% of the population and about 60% of the geography. Rural America is essentially served by a large number of small, independent telephone companies, and in the last year the growth of cable systems with satellite earth stations have created an ad hoc rural network for certain program services. Phenomenal growth of telecommunication systems--phone or TV--is catalyzed by population density because the modus operandi, motivated by profit, is subscription service. Telecommunications technology in a dense population quite logically promises more income per capital-outlay dollar. By comparison, much more investment is needed to wire rural America, and the subscription potential is less.

For a broadband (essentially television) rural interconnection network to be feasible, most entertainment and non-entertainment telecommunications services considered desirable by the rural community would have to be conjointly packaged and packaged so most rural areas are attracted. (This could mean a combination of program/information services as apropos to rural Appalachia as to the Northern Rockies--admittedly a difficult package to conjoin.)

In addition to the service package, the legalities of carriage must be faced. Appropriate linkages must be established between the Bell System, the company which becomes principal investor in the rural interconnection network, and the independent telephone companies which now serve most rural communities. Present regulations prohibit a single owner from controlling both the cable TV franchise and the telephone company in a community.

Many proponents of rural telecommunication development feel that federal regulations have been a barrier. For example, the FCC bars cross-ownership of telephone and cable lines. This regulation is presently under review. Although waivers are available in communities where competitive provision of telephone and cable television services is not feasible, the FCC's case-by-case approach and waiver criteria may have discouraged new development.

Constraints

The structure of the present system of public services in rural America, both economically and programmatically, may not be consistent with the requirements of a rural telecommunications network. A classical problem -- too much autonomy, fragmented decision making, piecemeal services. Implementation of a comprehensive information network may face organized resistance and probably will take years to accomplish. The problems encountered in facilitating change are institutional in nature. The lack of a well-developed organizational mechanism to accomplish meaningful change has no doubt impeded progress.

Programs and services in rural communities reflect priorities in non-technical areas; e.g., housing, water, energy, jobs, roads. Although telecommunications technology could alleviate some of these problems, it has not been seen as an important priority in its own right. Telecommunications must be interpreted as a tool to solve problems, not as another problem.

Although there is agreement that federal funds are available to support rural telecommunication, there are numerous problems that have to be resolved before funding can materialize. Most federal monies are funneled through state agencies and then to local agencies. Funding restrictions on capital outlays, duplication of efforts by different social service agencies, and the fickle nature of federal funding patterns perpetuates demonstrations and stifles ongoing, continuous services. Those who have worked in rural telecommunications recognize the need to change attitudes of decision makers regarding technology. There is still a feeling that telecommunication alternatives are not yet viable possibilities, other than for demonstration. There is a reluctance to invest in hardware when people perceive the system as experimental. There is a feeling that innovation, per se, does not necessarily improve quality or reduce costs. A very good case and tremendous patience will be required to aggregate the resources and requirements of the public service community.

Satellite Communications

Communication satellites would definitely play a critical role in the creation of a rural telecommunications network. Satellite communication has several characteristics that make it very attractive to organizations which are concerned with health care, education, library service, public safety, business and industry. These advantages are most apparent when the organization is attempting to deliver services over large, sparsely populated areas, where distance-insensitive satellite service is a significant factor.

Satellite systems are also flexible. New points can be added to a network by installing an earth station. without regard to the difficulties of distance and terrain which plague the installation of terrestrial systems. This feature is particularly important in rural areas. The availability of smaller, simpler and less expensive earth stations, make this characteristic ever more attractive today.

Satellite carriers provide more flexible interconnection arrangements to owners of local broadband networks than terrestrial carriers. The advent of Cable Net II, hotel networks and other dedicated distribution systems offer the client in the population center a number of attractive alternatives. Broadly speaking, satellite carriers offer "bandwidth in bulk," while terrestrial carriers offer individual services.

Certain public services are not desired or required because people are not aware or because it has not been feasible to provide such services. Flood control was demanded as soon as people figured out how to do it. Broadcast news became a public requirement as soon as radio made it possible. Because of space technology, we have the communications capability to address a number of problem areas previously unattended: disaster relief, search and rescue, navigation, cargo tracking, monitoring of water supplies or forest fire conditions, and emergency medical service. Solutions exist and services are possible, but only public demand will stimulate the inertia to generate change.

Satellite Communications. . .

Every satellite system in existence has been formed around an organizational and financial backbone. The Intelsat system was able to expand quickly during the mid-1960's because NASA required reliable communications to support the Apollo missions. The domestic systems in the Soviet Union, Canada, and Indonesia were built to serve a defined government market for communications. The Marisat system was made possible due to the early support of the U.S. Navy. Closer to home, no one will argue that the Public Television Satellite System established WESTAR. Similarly the RCA/SATCOM network would still be in the red today without the cable system connection.

Advocates of a rural satellite network argue that subsidization is needed to establish the system but that recurring revenue from operational services would realize a self supporting enterprise.

Rural Education

Rural education is particularly amenable to the use of telecommunications technology primarily because of the inaccessibility and inequality which characterize the conventional education in rural America. Rural areas, by the very nature of their geographic isolation, have unique educational needs.

The Office of Technology Assessment study on "The Feasibility and Value of Broadband Communications in Rural Areas," found the two major factors influencing quality and access to education in rural areas are economic characteristics of the community and organizational structure of educational systems. The importance of economic characteristics lies in the fact that major financial support for education comes from the local community. Approximately half of all funds supporting public elementary and secondary education are obtained from local sources. State governments contribute an average of 42% and the balance comes from the Federal Government.

Although it varies from state to state, the Federal Government contributes only a small amount (roughly 10%) of support for education.

Rural Education. . .

Equal educational opportunities cannot be guaranteed for poverty areas when the federal contribution provides only 10% of an already shrinking educational budget.

Revenue for local school systems in nonmetropolitan areas is financed primarily by property taxes. However, 60% of the nation's substandard housing is in rural areas where only 20% of the federal housing assistance dollars are channeled. The disparity is obvious. There is a limited tax base to generate local economic support of rural educational systems. In addition, rural communities have a lower per capita income and a higher incidence of poverty than metropolitan areas.

Certification issues can also restrict the use of telecommunication systems. Funding patterns perpetuate the traditional classroom unit which requires a certified person in each classroom to comply with funding regulations. Education is labor intensive -- more so in rural schools. Although telecommunications can help to alleviate the problem, it's a delicate issue. With cost containment becoming a major factor in our schools, something must be displaced to accommodate use of telecommunications as an alternative. The biggest line item in any school is personnel. A 5% line item transfer of funds may not significantly affect a large school district, but it can be devastating to a small school district. Similarly, 5% of a large school district's budget is theoretically enough to acquire just about any new technology, but 5% of an already limited budget won't buy much in a small rural school.

It is not uncommon for school districts to allocate 80% or more of their budget to salaries; and, because the total budget is relatively small in most rural districts, teachers often receive proportionately lower salaries. This, then, leaves 20% of the budget for all remaining expenditures, including facilities, equipment, programs and curriculum materials. Without subsidization, additional capital outlay for advanced technology is virtually impossible.

Educational Administration

Education has undergone profound internal alterations in the last decade. The impact on school administrators has been significant. With all the changes in society today, many of which intimately involve public education, school administrators are being confronted with a multitude of problems.

The most troublesome issues include enrollment shifts, a surplus of teachers, or inability to attract teachers, increasing specialization, civil rights, collective bargaining, accountability, discipline problems, desegregation, energy conservation, and new funding patterns. Perhaps the issue that is most familiar to the traditional administrator is parental concern for quality education. The "back to basics" movement is all too familiar to the school administrator.

A school administrator, particularly in a rural school, needs improved access to information. An occasional workshop for administrators is inadequate. The answer may be found in a rural telecommunication network. Such a system could provide relevant, up-to-date, and economical information to rural school administrators.

A rural telecommunication network with interactive computer capabilities could be used to monitor student progress and give options for further study. The rural information network could be used to reduce administrative paperwork. School administrators are burdened with reporting information to state and federal agencies on a variety of subjects: student and teacher personnel data, attendance data, and financial reports. While a centralized computer storage and retrieval facility normally is available to larger school systems, the rural school administrator still must operate a paper-pencil-mail delivery mode.

A rural telecommunication network could be used to facilitate communications between state agencies and school personnel. State agency planning and school service personnel need to communicate frequently with school personnel, counselors, administrators, school boards, citizen accountability committees, and teachers. The wideband distribution capability of satellite systems also offers an economical alternative to travel. State

and regional educational agencies could more readily interact with rural schools on topical issues, trends, and concerns.

Migrant Education

Rural schools are also plagued by the mitigating problems associated with migrant populations. Approximately 1.4 million people in the United States are migrant workers; that is, agricultural laborers who move to find work wherever there is a seasonal demand. These migrants include Chicanos, Blacks, Indians, Puerto Ricans, and Anglos. They move in three broad streams from Florida, Texas, and California through forty-seven states.

Predictions on the future magnitude of the "migrant problem" vary. At first glance, the migrant population appears to be decreasing as a result of the increased use of agricultural machines and the reduced need for field labor. A closer inspection, however, reveals that the migrant population is growing because single male workers are being replaced by entire families. It is unlikely that this population will decline for at least ten to fifteen years.

The problems and needs of migrant workers and their families probably have not increased in recent years, but the nation's concern for them has. The emergence of migrant spokesmen, a heightening consciousness of civil rights, and the publicity given to these issues, have all contributed to growing political pressures for programs to better serve migrant families.

The primary needs are common to all states with sizable migrant populations: adequate housing, basic health and nutritional services, appropriate educational opportunites, information regarding employment standards, and assistance. Although most states allocate resources to meet "primary" needs, funds are either unavailable or inadequate to address the educational needs of migrant children.

Those states with a substantial migrant poulation, of course, cannot overlook that group's special needs while other services are initiated and expanded. More effective use of telecommunication technology would expand and improve services and programs to the migrant population. The need for

a relevant program plan, however, is a prerequisite. To date, excluding isolated attempts to utilize mediated instruction, there has been little evidence of any concerted effort to apply labor and cost-saving technology to the problems inherent in migrant education.

The Migrant Student Record Transfer System, an intersate system located in Little Rock, Arkansas, computes and analyzes information on the migrant population. The need for such a system is critical, since there is evidence that migrant children have been re-innoculated or re-tested because of a clinic's or school's inability to obtain updated records. Record keeping is a difficult problem. The migrant family does not usually announce its arrival or departure, creating an additional time lag between arrival, identification of needs, and commencment of service delivery. Immediate access to a comprehensive data base could enhance educational service delivery to migrant children by reducing duplication in record keeping and by providing continuity to the curriculum. Federal assistance is available but eligibility is essentially limited to local and state education agencies, thus diminishing possible impact on inter-state migrant requirements.

Fragmentation of services and programs at the state and local level further compounds the problem. In most states, it is unclear where responsibility for migrant services lies. The taxpayers in general, and employers in particular, are wary of providing additional services, which will entail restrictive state and federal regulations. Except in those states where migrants return after the harvesting season, the problem does, after all, disappear for much of the year.

In the face of these realities, relevant programs and services for the 500,000 migrant children seeking an education are rare. The lives of migrant children are commonly unstable, uprooted and chaotic; their school attendance is likewise sporadic and inconsistent. Ninety percent of these children never finish high school and their average education level is fourth or fifth grade.

Migrant Education. . .

The problem of providing services to migrant youngsters is national in scope, interstate in nature, and rural in application. There is little likelihood that the necessary programs will be adequately funded either by the Federal Government or by individual states. Migrants pose an unique and complicated problem because they generally cross several state boundaries. In addition, accurate data on their numbers and travel patterns are almost nonexistent. Intrastate workers -- those who may travel substantial distances but do not cross state lines -- may not be counted at all.

There is an obvious need for some mechanism to coordinate and aggregate the existing resources, and in turn provide a better means of service delivery to migrant populations. Appropriate use of telecommunications could dramatically upgrade the level of service to migrant populations. The same system could be utilized in a wide range of applications in rural schools.

Special Education

It has been well documented that individuals with mental or physical handicaps are often excluded from schools and educational programs, barred from employment, or are under-employed because of archaic attitudes and laws, denied access to transportation, buildings, and housing because of architectural barriers and lack of planning, and discriminated against by public laws. The American public, in general, is simply unfamiliar with and often insensitive to difficulties which confront individuals with handicaps. When by chance or circumstance the handicapped individual lives in rural America, the problems are magnified.

In the United States, there are an estimated seven million deaf, blind, mentally retarded, speech impaired, motor impaired, emotionally disturbed, multiply handicapped, or other health impaired school-age children. In addition, there are an estimated one million pre-school handicapped children who require special education programs. These children represent approximately 10% of the school-age population, and although the number of handicapped children receiving special education services has increased, only about 40% of these children are receiving an education which is

designed to enable them to approach their maximum capacity. Additionally, there are an estimated one million handicapped children who are totally denied access to a free public education. Further, there are an estimated 125,000 mentally retarded, emotionally disturbed, and physically handicapped children who live in state institutions where most education programs are inferior or nonexistent. The implications for the handicapped in rural America are evident.

Theoretically, any program or service for the handicapped available in the cities could be adapted for use in rural schools. But new methods for serving the educational needs of rural communities are needed. To support any comprehensive instructional delivery systems there must be an array of special services and programs. As teachers individualize instruction for pupils and as schools provide more instructional services for individual pupils, there must be an effective system for delivery of special information and materials to teachers and pupils. Services include special transportation, special seats, electronic communications equipment for health and education, consultative services, instruction for homebound students when necessary, public information, etc. Access to services and programs not readily available, or difficult to justify because of geographic constraints or low incidence, could be shared with other communities through use of telecommunications.

Gifted Education

The rural isolated gifted child presents another unique problem. Most schools cannot afford to single out one or two gifted children for special help; there may not be enough gifted children in the whole school to justify the extra time and expense of identification, let alone special treatment. In addition, many rural teachers, because of their relative isolation may not be aware of existing enrichment resources for the gifted and many schools interpret the symptoms of the thwarted gifted child as behavioral disorders.

Gifted Education. . .

Gifted children demonstrate a wide variety of exceptional talents, only one of which could be called "academic." Academic talent is widely accepted as a main characteristic of gifted children. Most teachers are already aware of, and to some extent prepared to cope with, the heightened intellectual or academic, ability of some children. But what about the highly creative or artistic child who is visually oriented, or the child who is performance oriented, who is physically expressive, or the child who has exceptional spiritual or social perceptivity?

Telecommunications can be the vehicle for enriching the curriculum in rural schools. A variety of enrichment programs could be transmitted to any participating school. The interested child could elect to watch selected programs, providing a way for schools to bypass the additional responsibility of devising a new curriculum. Teachers in rural schools admittedly over burdened would be relieved of the extra pressure of developing special materials for the one or two students who seek special challenge. An interactive system would also enable a gifted student to converse with experts in the special fields of study.

New alternatives for serving the educational needs of rural communities must be sought. The national commitment to equal educational opportunity must be met. Platitudes and good intentions no longer suffice. Innovative ways to resolve the critical issues impacting on rural education must be pursued. The need to upgrade educational programs, services, and teacher training in rural communities is rapidly moving toward a critical juncture. A rural telecommunication network could be the equalizer.

Public Television in Rural America

The need to extend public television service to geographically isolated communities has been well-documented in the past; however, service has not been technically or economically feasible. In 1978 the PSSC, under contract to CPB, examined operational alternatives for extending or improving public

television service to rural communities in Wyoming, Montana, and the Appalachian region. The study, "Public Television Service in Rural America," was given impetus by recent developments in telecommunications technology.

A very simple rationale: high-powered satellite systems and lower-cost earth stations make it possible to receive television programs directly from the satellite in areas which are not served by existing public television stations. The public television satellite system provides an opportunity to initiate an operational scheme to extend public television to rural America.

As part of the study, data was compiled on technical and financial requirements for receiving public television using small earth stations in conjunction with mini-transmitters, cable systems, and translators. Community interest and willingness to support public television were also examined.

Findings from the study reinforced what was already known. Commercial television is now available in most rural communities because of cable and translator service. It may be poor or spotty, but it's there. Public television, on the other hand, is still not available in most areas of Montana and Wyoming. Public television in Appalachia is more prevalent, however, the signal quality is poor in many rural, isolated communities.

The study was completed to fulfill the contract with CPB. PSSC, however, was encouraged to proceed in developing an operational plan that would facilitate extending public television to selected rural communities in Wyoming and Montana. CPB committed funding for planning activities. The National Telecommunications and Information Administration's Public Telecommunications Facilities Program made encouraging sounds about funding equipment and facilities. Several other timely events provided additional impetus.

The public television satellite system, which interconnects the nation's public television stations via Western Union's WESTAR satellite,

became operational in 1978. The WESTAR signal covers all of the United States -- all of it, including rural America. Contributions from rural America helped pay for this system.

The proliferation of small earth stations and the de-regulation of licensing of receive only earth stations were other contributing factors. Another significant event was the December 8, 1978 FCC decision that allows translators to receive an FM microwave signal -- or essentially a satellite signal. Previously this was not allowed. It was also recognized that problems regarding program rights and distribution, as well as a number of regulatory problems which restrict public television distribution using small earth stations, translators, cable, and mini-transmitters would need to be resolved.

A more fundamental issue remained: dollars. There is now an expanded funding base to support telecommunications activities in rural America. The big plus could be the Public Telecommunications Facilities Program (PTFP). The facilities program, transferred from HEW to the National Telecommunications and Information Administration (NTIA) in the Department of Commerce, provides fund for facilities and equipment for the extension of public telecommunications services to as many citizens as possible. Telecommunications services are defined as noncommercial educational and cultural radio and television programming and related noncommercial instructional or informational materials.

Previously PTFP funds were earmarked exclusively for public radio and television station activiation or expansion. The new regulations provide greater latitude. It "permits for the first time Federal funding for the nonbroadcast distribution of noncommercial educational and cultural radio and television programming and related noncommercial instructional or information materials." It also "provides that not less than 75% of appropriated funds shall be available for the extension of public telecommunications services to areas not presently receiving such service." Other agencies will now be eligible. A community translator association is eligible; this was not so before.

Public Television in Rural America. . .

More importantly, the number one priority for PTFP specifically addresses the needs of rural America. "Priority I - Provision of Telecommunications Facilities for First Service to a Geographic Area." Within this first priority, three subcategories will be established: (a) "Projects to establish telecommunications facilities which include local origination capacity." (b) "Projects to extend existing telecommunications delivery systems." (c) "Projects to establish telecommunications delivery systems without local origination capacity."

In the spring of '79, PSSC prepared and submitted a proposal for PTFP funds on behalf of 3 rural communities in Wyoming and 7 in Montana. The requested funds would be used to procure and install small earth stations and the associated electronics to enable each of the communities to receive and broadcast public television programs.

The plan was for PSSC to assist the communities in acquiring the necessary equipment. The earth station and mini-transmitter, however, would be licensed in the name of an appropriate community agency. Ownership of the equipment would also be in the name of a community agency. PSSC would provide the necessary assistance to license and install the equipment and, if needed, would provide subsequent maintenance support to the community, under a separate contract.

The proposal process was cumbersome. The task required to complete FCC forms to construct and license the earth station and the translator (min-transmitter) in each community was mammoth. There were over 500 pages of forms for each community. Such a requirement is enough to discourage even the most enthusiastic of communities. When even copying is a problem, it is unrealistic to expect a small rural community of a few hundred people to complete the forms without assistance. This has a direct bearing on funding because without forms the bureaucracy does not function.

The proposals were submitted, reviewed and accepted conditionally. However, a new problem was created by PTFP. The staff determined that the grants could not be made unless a program service was identified and approved. The applications had identified several programming sources, such as individual licensees, regional networks and the Public Broadcasting

Service basic feed. One station, KRMA in Denver, Colorado had agreed to allow its broadcast schedule to be utilized. But, by solving the program rights problem an economic problem, namely, the cost of a transponder was created.

In the short term, until a rural program service could be established on an individual channel, the only available program service would be the PBS basic feed. The grants were denied in 1979 with assurances that funding would be available subsequently if the program access issue was resolved. In early 1980 PSSC resubmitted the proposals on behalf of all ten rural areas. Concurrently PSSC petitioned PBS to allow unmanned small earth stations to receive public television programs directly from the WESTAR satellite. The Distribution and Support Service committee reviewed the request and directed the staff to study the implications further. The committee said it was concerned with efficiency, localism and precedent setting. To compound the PBS negative decision, FCC staff waffled and all ten applications were in jeopardy once again. It was assumed that the problem of licensing mini-transmitters had been solved. Initially FCC staff indicated there would be no difficulty licensing the low powered mini-stations since a precedent had been established in Alaska. Recently because of related licensing problems the FCC has refused to rule on such applications pending an exact rule making about low powered transmitters. Consequently because PTFP cannot reserve funds, the proposals were not approved.

Further study was not required, the implications were clear. Most rural communities do not receive public television. The ad hoc distribution system proposed by PSSC could have alleviated the problem. There is no sound explanation for the PBS or FCC decision. Establishing a precedent is not a valid reason. The inherent problem surfaces when one probes the politics in public broadcasting. The initiative for this activity came from CPB. They supported a study "Public Television in Rural America" in 1978. Subsequently, funding proposals and FCC applications for first time public television service were prepared and submitted. It was not designed as an experiment or demonstration. It would be an operational service though it would not be the ideal system. Scheduling would present minor

problems, and momentarily losing the signal between programs could be an aggravation, but the rural viewer has learned to cope with electronic adversity and would accomodate. When a signal is available they will watch it. It is also reasonable to expect that such problems would be alleviated as the service evolved. Unfortunately the bureaucracy prevailed and once again at the expense of rural America.

Conclusion

Ten small earth stations located in rural Montana and Wyoming cannot be construed as a telecommunication network. The experience, however, in attempting to solicit funds, acquire program rights and resolve regulatory problems will have proven invaluable if and when a rural telecommunication network is launched. The experience also suggests additional study. Certain questions need to be answered. *What are the major factors which will influence implementation of a rural telecommunications network? What commercial, noncommercial, and entertainment services appear to be most amenable to aggregation in rural America? What options are available to finance the network? What is the ability and willingness of rural users to pay for services?*

It is unlikely that telecommunications will be utilized extensively in rural America in the absence of fundamental organizational changes. Use of appropriate labor-saving technology probably would result in productivity gains, but first there must be coordinated planning and agreement on the basic objectives which are to be addressed in the public service.

Without diminishing the potential of telecommunications technology, adoption by public agencies is a slow process. When the setting is a rural environment, the pace of progress is even slower. The organizational and institutional factors which constrain adoption of new technology are complex but not insurmountable. Despite the inherent difficulties encountered in facilitating change and adopting innovation, telecommunications holds real promise for alleviating many of the problems in rural America.

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PRODUCT CATALOG

THE EXCEPTIONAL CHILD CENTER·UTAH STATE UNIVERSITY·LOGAN·UTAH

PRODUCT CATALOG

Outreach and Development Division
The Exceptional Child Center
Utah State University UMC 68
Logan, Utah 84322

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NEW PRODUCT HIGHLIGHTS

ACADEMIC PACKAGES

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2. Cursive
3. Transfer

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ADDITIONAL CATALOG ENTRIES

(To Be Forthcoming)

Technical Paper #23015 is listed incorrectly. It should be Technology in Special Education - Hofmeister	

PRODUCT CATALOG ORDERING INFORMATION

The Outreach and Development Division of the Exceptional Child Center disseminates materials for the handicapped. These materials have been developed and field-tested by the Exceptional Child Center. Many of the materials have also been used extensively for non-handicapped persons.

A cross-reference skill level chart has been included as a guide to the grade level of curriculum materials. This is only to describe the developmental or grade level at which this curriculum is usually taught, not necessarily the level at which the student is functioning. The page entitled "Additional Catalog Entries" is for products added to the inventory after this printing date. Future catalogs will contain these entries. For most of the materials there is no requirement for specilized training or teaching experience in order to implement the program. Parents, older siblings, and family can use many of these programs, as well as teachers, paraprofessionals and professionals.

*NOTE

The Product Dissemination service is a nonprofit service to all who help meet the needs of the handicapped. Therefore the charges are to cover printing, shipping, refinement and handling only. Prices are effective February 28, 1981. Changes may be made on short notice to cover increases in costs, ordering and shipping.

ORDERING & SHIPPING

Ordering

All orders should be completed on the order form at the back of this catalog with all pertinent information. Both the "Bill to" and "Ship to" sections must be filled out to assure proper delivery. Shipping charges will be prepaid for your convenience and added to the total of the invoice. Terms of payment are net 30 days. If you require claim forms with invoices, please list the number of copies required with each order and enclose the forms.

Delivery

Normal shipping time is within 7 days after receipt of the order. Allow up to three weeks for delivery. Orders are shipped by the best and most economical means as determined by our shipping department, unless otherwise specified.

General Returns

All returns must be received at our office within 30 days after receipt of the order. Materials that are returned must be received in marketable condition, or appropriate charges will be made.

Textbook Returns

If a book or program has been ordered as a textbook (i.e., by a college bookstore), it may be returned at the end of the quarter when the bookstore has decided the book will not be used. Again the materials returned must be received in marketable condition, or appropriate charges will be made.

Previews

Sorry, we do not have a preview policy, as the person power and paper work required to handle previews on products is prohibitive. If you would like more specific product information, write to this office in care of the product dissemination coordinator.

Address:

Outreach and Development Division
The Exceptional Child Center
Utah State University UMC 68
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Out of State: (801) 750-1991
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EARLY DEVELOPMENT PACKAGES

MOTOR SKILLS

15005 MOTOR DEVELOPMENT I: PRESKILLS FOR SITTING AND MOVING ABOUT. $3.30

Designed to teach the child skills for headlifting from a prone position to sitting without assistance. Learning and practice exercises are provided for stengthening the back, neck, and arm muscles prerequisites to sitting and moving about, as in rolling, crawling, and walking. The materials are intended for use with children who are delayed in motor development, but have not extensive physical disabilities.

15006 MOTOR DEVELOPMENT II. SITTING AND MOVING ABOUT. $3.30

Procedures are presented for teaching a child skills which range from reaching for and picking up objects while sitting through standing and walking without assistance. The materials are intended for use with children who are delayed in motor development but have no extensive physical disabilities. The skills taught in MOTOR DEVELOPMENT I are prerequisite.

17004 MOTOR DEVELOPMENT PROGRAM $14.80

See Special Series - CAMS

VISUAL-MOTOR SKILLS

1 309 MATCHING SIZES, SHAPES, AND COLORS. . . . $ 4.15

Designed to teach the child to match objects on the basis of their sameness in color, size (large/small), or shape (circle, square, or triangle). The materials used are found in the home (i.e., pencils, crayons, etc.)

SPEECH DEVELOPMENT

14004 IMPROVING SPEAKING SKILLS $5.00

Designed to help the child who has trouble enunciating correctly. Has exercises for specific work on sounds that are generally in need of correction (i.e., t, m, s, and w).

17003 EXPRESSIVE LANGUAGE PROGRAM $10.50

See special series - CAMS

LANGUAGE DEVELOPMENT

14001 TEACHING THE RETENTION OF IMPORTANT ORAL PHRASES AND NUMBERS (DEVELOPMENTAL LEARNING MATERIALS, INC.) $4.75

Provides instructions for teaching the learner to say his name, address, city, state, phone number, and names of significant others (i.e., mother, father, aunt, uncle, sister, brother, etc.) Also teaches common social responses (i.e., answering the telephone, welcome, thank you, etc.) Includes the contants of the earlier package SPOKEN NAME, ADDRESS AND PHONE NUMBER.

14003 A PROGRAM FOR TEACHING THE UNDERSTANDING OF FUNCTIONAL WORDS AND PHRASES (DEVELOPMENTAL LEARNING MATERIALS). $4.40

Provides specific instructions in the teaching of simple spoken directions (i.e., come here, sit down, stop, go, look at me, etc.)

17002 RECEPTIVE LANGUAGE PROGRAM. $8.50

See special series - CAMS

ACADEMIC PACKAGES

READING

11001 LETTER NAMING $4.95

Helps you teach the child how to name and identify the letters of the alphabet. Includes two lesson formats: one which teaches new letters to the child and another that reviews letters that he/she already knows.

11002 A PROGRAM FOR TEACHING THE RECOGNITION OF FUNCTIONAL WORDS (DEVELOPMENTAL LEARNING MATERIALS) $8.80

Provides instructions for teaching the learner to recognize functional words. Includes the contents of the earlier package, SURVIVAL WORDS. This program teaches the recognition of 20 different words important to every day living, (stop, go, pull, push, etc.)

11003 SOUND SYMBOL $7.15

Intended for children in the elementary grades who do not know the sound of letters. Designed to help a parent or teacher teach the child the sounds of the consonants and vowels. A cassette tape demonstrating the basic sounds in included for the instructor's convenience.

11004 BLENDING SOUNDS $9.10

Designed for children in the elementary grades who cannot "sound out" words in reading. Children will learn to blend sounds in a word rapidly, without pausing between sounds. Sounds included in this package are vowel dipthongs, irregular vowels, and all the sounds that were taught in the SOUND SYMBOL package.

11005 BEGINNING READING $11.00

11006 Instructor's Manual . . . . . .$ 2.75
11007 Student Manual. 6.60
11008 Storybook 1.65

Stresses basic skills with letter sounds and their blending. Provides practice in the application of these word attack skills through the use of a student workbook. The workbook also includes practice in reading sentences and paragraphs composed of words and sounds taught in the program. The student is placed into the program by a pretest, and can see gains through the posttest. As a final reading help, the package includes a full story composed of word and sounds taught in the workbook. The package is appropriate for persons who have had a year or less of reading instruction or need practice in word attack

11010 SOUND SYMBOL AND BLENDING (EB-PRESS TUTORIAL SERIES). $7.15

11011 Instructor's Manual. $2.75
11012 Student Manual $4.40

This package teaches basic letters and their sounds and blends. The previous program (Beginning Reading) was adapted from this program. It contains an instructor's manual with directions on how to implement the program and a student workbook which contains drills on words using the sounds taught.

11013 WORD RECOGNITION $7.15

Intended for children in the elementary grades who lack a sight vocabulary. Helps a child recognize words that he is not able to sound out according to word attack methods.

11014 WORD ENDINGS (EB-PRESS TUTORIAL SERIES) . . $3.85

11015 Instructor's Manual. $2.20
11016 Student Workbook $1.65

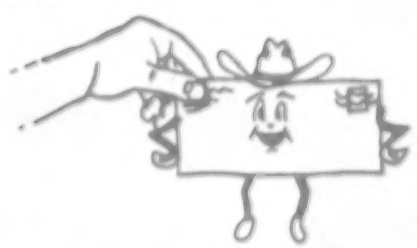
Designed for students who have trouble omitting or confusing word endings (i.e., ed, ing, ly, or silent final "e" and a long vowel sound). This book can be used in conjunction with Beginning Reading and/or Functional Decoding and Vocabulary Building.

11017 VOCABULARY BUILDING $4.15
Intended for use with children in grades 5-12 who can read at the fourth grade level or higher, who need extra practice in oral reading, word recognition and word comprehension. Can be used by parents and teachers.

11018 FUNCTIONAL DECODING AND VOCABULARY BUILDING (EB-PRESS TUTORIAL SERIES) $4.95

11019 Instructor's Manual $2.75
11020 Student Workbook. $2.20

For students who have mastered basic decoding skills, but who have difficulty reading irregularly spelled words and adding new words to their vocabulary. Also includes practice in comprehension and usage.



READING continued
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Letter Naming $4.95
Sound Symbol. 7.15
Blending Sounds 9.10
Beginning Reading 11.00
Word Recognition. 7.15
Vocabulary Building 4.15
Value 43.50

MATH

13001 NUMBER SKILLS $6.35

Designed to teach your child the names of the numbers one to ten, how to match these numbers, how to identify these numbers, and how to count from one to any number up to ten.

13002 NUMBER SKILLS (EB-PRESS TUTORIAL SERIES). . $3.30

The first basic program in the series of tutorial arithmetic programs. For children who consistently misidentify numerals 1 to 20, who cannot count accurately in sequence, and who are unable to count to a specified number.

13003 A PROGRAM FOR TEACHING THE COUNTING OF OBJECTS (DEVELOPMENTAL LEARNING MATERIALS, INC.). . $4.95

Teaches the child to coordinate the verbal statements and the motor movements necessary to count objects accurately from one to ten. This contains the contents of the earlier COUNTING OBJECTS Package.

13004 NUMBER SYMBOLS. $7.50

Teaches the child the concepts "more," "less," and equal." The child will learn the plus, minus, and equal signs and how to add and subtract one for the numbers one to ten.

13005 ALL MATH COMBINATIONS $13.50

The parent manuals in each of the four math packages below are identical. Only the sets of flashcards are different. This package allows you to save money by buying one manual and all four sets of flashcards at one time. The math packages are intended for use with children of any age who need practice in combinations.

If you desire to buy them separately, they may be bought as listed below.

13006 Addition. $5.80
13007 Subtraction 5.80
13008 Multiplication. 5.80
13009 Division. 5.80

13010 MATH COMBINATIONS (EB-PRESS TUTORIAL SERIES) $12.65

13011 Instructor's Manual & Cards $7.15
13012 Student Workbook +/- 2.75
13013 Student Workbook x/÷ 2.75

Builds on the base of the NUMBER SKILLS program to teach the student over 400 math combinations through a variety of quickly paced and reinforced activities. Designed for students who have mastered their basic counting skills, but are unable to consistently add, subtract, multiply, and divide basic counting numbers.

13014 CARRYING AND BORROWING. $11.00
Intended for children who cannot carry and borrow in addition and subtraction. Teaches basic carrying and borrowing and how to discriminate when to carry and when not to carry or borrow. Includes full set of flashcards.

13015 CARRYING AND BORROWING (EB-PRESS TUTORIAL SERIES). $7.15

13016 Instructor's Manual 4.95
13017 Student Workbook 2.20

Designed for students who can add and subtract single-digit numbers (0 + 0 through 9 + 9 and 9 - 9 through 1 - 1), but who make mistakes in carrying and borrowing. Provides for extensive student practice.

13018 ADDITIONAL FLASHCARDS $16.50
13019 Addition Flashcards 2.75
13020 Subtraction Flashcards. 2.75
13021 Multiplication Flashcards 2.75
13022 Division Flashcards 2.75
13023 Carrying Flashcards 2.75
13024 Borrowing Flashcards. 2.75

13025 AUDIO-TUTORIAL MATH PROGRAM $58.55

A self instructional program on cassette tapes designed for use after a student has received systematic instruction in the basic arithmetic combinations. The main purpose of the program is to provide practice and repetition in the four basic combinations of addition, subtraction, multiplication, and division. Can be used individually or in group setting with either slow or advanced students. Thoroughly researched and field tested, this program is self-contained. The tapes have been professionally recorded through Superscope, Inc. and have excellent volume and clarity. Should any tape be found to be defective, it will be replaced immediately, free of charge, by return mail. The program includes 25 cassette tapes, a Teacher's Manual, diagnostic tests, test sheet master, and individual progress and record sheets.

Includes: 6 addition cassettes $12.50
5 Subtraction Cassettes 10.50
7 Multiplication Cassettes 14.60
7 Division Cassettes 14.60
Manual Packet 6.35

GROUP PACKAGES

16001 MATH SET - $35 (savings of $3.05)
Number Skills . . . . . $ 6.35
Number Symbols. 7.50
All Math Combinations 13.20
Carrying and Borrowing. 11.00
Value $38.05

WRITING

12002 MANUSCRIPT WRITING. $11.00
12002 Practice Cards & Paper. 7.15
12003 Instruction Booklet 2.20
12004 Pretest-Posttest. 1.65

Helps the parent or teacher to instruct the student in printing. Includes practice cards, paper, and instructional booklet with pretest/posttest. Designed to help the student who has not learned to print, as well as help improve the printing of students who have the basic skills and need practice for readability, neatness, etc.

12005 CURSIVE WRITING $11.00
12006 Practice Cards & Paper. 7.15
12007 Instructional Booklet 2.20
12008 Prestest/Posttest 1.65

Helps the parent or teacher to instruct in cursive writing (handwriting). Includes practice cards, paper, and instructional booklet with pretest and posttest material. Designed to help the student just beginning cursive writing instruction, as well as the student who needs additional practice in improving their basic skills in cursive writing. Practice cards include single letters, letter combinations, and words and sentences.

12009 RESOURCE BOOK: A PROGRAM FOR THE CHILD WITH HANDWRITING PROBLEMS. $5.50

A task analysis method of remediating handwriting, designed to remediate the child's specific errors in writing skills. Contains programmed sequence for names and addresses, a program designed to teach those with handwriting difficulties to write their own names, addresses, and phone numbers. Also included is a brief article on detecting and making adjustments for the left-handed student, along with student monitoring forms. This resource can be used along with the above mentioned manuscript and cursive writing packages.

Available April, 1981

12009 MANUSCRIPT KIT (DLM HANDWRITING PROGRAMS) .$49.50

Includes Teacher Guide, Transfer Techniques Booklet, Resource Book, Hand- writing Holders (5 Sets), Response Book, Model Cards (5 sets), Correction Guides (5 sets), paper (250 sheets) practice sheets, assessment sheets and Student Record Form.

12011 CURSIVE KIT (DLM HANDWRITING PROGRAMS) . .$49.50

Includes Teacher Guide, Transfer Techniques Booklet Resource Book, Handwriting holder (5 Sets), Model Cards (5 sets), Correction Cards (5 sets), paper (250 Sheets) practice sheets, assessment sheets and Student Record Form.

12012 Handwriting Transfer Technique Booklet . . $1.50
12013 Resource Book $2.50

SPELLING

14006 AUDIO-TUTORIAL SPELLING PROGRAM . . . $77.25

Designed for individual use by students who are at the third grade placement in school or higher and who have had some writing, reading, and spelling experience. Intended for remedial use, but could be used with students who need to move faster than average. The major advantages of using this program are (1) diagnosis and placement are an integral part of the program; (2) the teacher is free of the testing chore so that several different levels of achievement may be maintained in the classroom; (3) the child is allowed to practice in private without social recognition of his failures. A system for daily record keeping is included. The program includes 34 cassette tapes, a teacher's Manual, answer sheets, and individual progress and record sheet master (for "quickie" dittos). Any defective tape will be replaced, free, by return mail.

Includes:
6 Level A, Grade 2 Cassettes. $12.50
7 Level B, Grade 3 Cassettes. 14.60
7 Level C, Grade 4 Cassettes. 14.60
7 Level D, Grade 5 Cassettes. 14.60
7 Level E, Grade 6 Cassettes. 14.60
Manual Packet 6.35

14005 PROGRAMMED SPELLING (PARENT TUTORING SERIES) $5.50

Teaches the child to spell sixteen onesyllable words (mom, dad, yes, no, stop, go, out, in, and eight more). This package format may also be used to teach the child other words.

SELF HELP SKILLS

SELF-HELP SKILLS

15001 A PROGRAM FOR TEACHING INDEPENDENT DRESSING SKILLS (DEVELOPMENTAL LEARNING MATERIALS, INC) $5.50

Provides specific and practical instructions for teaching the learner to put on and take off: (1) pants, underpants, pajama-pants (2) T-shirts, pullover shirts, sweaters, and (3) jackets, front buttoning shirts, and cardigans.

15002 A PROGRAM FOR TEACHING INDEPENDENT USE OF ZIPPERS, BUTTONS, SHOES, AND SOCKS (DEVELOPMENTAL LEARNING MATERIALS, INC.). $7.15

Provides specific and practical instructions for teaching the learner to (1) button and unbutton shirt, (b) zip and unzip his jacket, (c) put on and take off his shoes and socks. and (d) tie and untie his shoes. Includes the contents of the earlier packages: BUTTONING, SHOES AND SOCKS, AND ZIPPING.

15003 TOILET-TRAINING (SHORT-TERM). $3.30

This program can be completed in a relatively short period of time (3 to 5 days). However, it requires a concentrated effort on the part of the parent (3 to 5 hours per day). At the end of training, the child should be able to perform all toileting functions on his own, including pulling pants up and down, wiping, and flushing the toilet.

15004 TOILET-TRAINING (LONG-TERM) $3.30

Many parents will not be able to devote the time and resources that the short- term method requires, therefore an alternative is offered. This program takes approximately 3 months to complete. At the end of training, the child should be able to go to the toilet by himself. The child is ready for this package if he can walk unaided and follow simple directions.

15007 EATING AND DRINKING $4.15

The intent of this package is to help a parent teach his child to eat with his fingers, eat with a spoon, drink from a cup, and drink using a straw. The child should be able to sit in a small chair or highchair, grasp objects, understand simple language, chew and swallow.

15010 A PROGRAM FOR TEACHING THE IDENTIFICATION OF COINS (DEVELOPMENTAL LEARNING MATERIALS, INC) $4.95

Provides you with specific and practical instructions for teaching the learner to name and identify coins: penny, nickle, quarter, half-dollar. Does not include instructions for counting money.

15011 TIME TELLING (EB-PRESS TUTORIAL SERIES . . $7.70

15012 Instructor's Manual 5.50
15013 Student Workbook. 2.20

For use with any child or adult who can count and identify numerals. Pupils need no knowledge of written English.

12001 WRITTEN NAME, ADDRESS, AND PHONE NUMBER . . $5.75

Helps you teach a person how to write his name, address, and phone number. Designed for the individual who needs this basic skill for daily living, self-care, emergencies, etc.

14002 EMERGENCY TELEPHONE SKILLS. $4.95

Helps you teach the child how to make an emergency telephone call to the operator when you direct him/her to do so. Will enable the child to dial the operator, relate his home address and request the police, a fire truck, or an ambulance. Will not teach the child to make a call without your direction.

15014 EASY BASIC SEWING $4.95

Shows you how to teach the child to measure and cut a thread for hand sewing, to thread a needle, and to make a holding stitch (instead of a knot) on a piece of fabric. Please specify RIGHT OR LEFT handed.

15015 SEAM STITCHING. $5.80

Enables you to teach the child how to make a backstitch by hand along a stright line with holding stitches at both ends. The child will be able to use this skills to mend a seam or to embroider. Please specify RIGHT or LEFT handed.

SELF HELP SKILLS
continued

15016 SEWING ON BUTTONS $6.05

Helps you teach the child to sew two-hole and four-hole buttons onto fabric. Cardboard buttons and small squares of muslin are included for practice. Please specify RIGHT or LEFT handed.

17005 SELF-HELP PROGRAM $13.50

See Special Series, CAMS

16003 SELF HELP AND BASIC LIVING SKILLS I $33.50
(savings of $4.35)

Eating and Drinking	$4.15
Play Skills	4.95
Toilet Training (short-term)	3.30
Toilet Training (long-term)	3.30
Parent Guide to Packages	2.20
Matching Sizes, Shapes and Colors	4.15
Balanced Nutrition & Exercise	4.95
Improving Speaking Skills	4.25
Motor Development I	3.30
Motor Development II	3.30
Value	$37.85

16004 SELF HELP AND BASIC LIVING SKILLS II . . . $26.40
(savings of $3.00)

Emergency Telephone Skills	$4.95
Time Telling	7.70
Easy Basic Sewing	4.95
Seam Stitching	5.80
Sewing on Buttons	6.00
Value	$29.40

16005 TRAINING FOR INDEPENDENCE (TFI) $55.00

Zippers, Buttons, Shoes & Socks	8.00
Independent Dressing Skills	6.95
Counting of Objects	6.00
Identification of Coins	6.00
Recognition of Functional Words	10.00
Understanding of Functional Words and Phrases	5.25
Retention of Important Oral Phrases and Numbers	5.75
When a Child Misbehaves	6.75

(Reward badges, a $7 value are included with the package)

Value $61.70

SOCIAL/ LEISURE SKILLS

19004 RECREATION I. $6.00

Includes four groups of easy activities for the child to do with minimum instruction or help from parent. Provides opportunity for both fine and gross motor development. Can be used as a good play activity. Includes FUN THINGS TO MAKE, EXERCISE AND PLAY, PENCILS AND CRAYONS, AND CUTTING WITH SCISSORS.

19005 RECREATION II $12.75

Provides a series of games and activities to review skills learned in many of the other packages. Includes COUNTING OBJECTS, NAMING LETTERS, NAMING COINS, NUMBER SKILLS, NUMBER SYMBOLS, SEAMSTITCHING, SEWING ON BUTTONS, SPELLING ACTIVITIES, SURVIVAL WORDS, WRITTEN NAME, ADDRESS AND PHONE NUMBER.

15008 PLAY SKILLS $4.95

Contains teaching suggestions for activities using a ball: rolling, kicking, throwing, catching, hitting, and bouncing. Also included are some quiet activities, including stacking a block, threading beads, hanging clothes pins, and putting together simple puzzles. Suggestions for encouraging group play are included. The child should be able to sit and stand well enough to hold his head up and use his arms. He should be able to grasp objects and follow the directions given.

17006 SOCIAL-EMOTIONAL PROGRAM. $12.20
See Special Series - CAMS

SCIPPY

19011 SCIPPY (SOCIAL COMPETENCE INTERVENTION PACKAGE FOR PRESCHOOL YOUNGSTERS) $12.50
(SCIP Project, George Peabody College of Vanderbilt University)

A self-contained package designed to promote reciprocal social interaction in preschool-age children and school-age handicapped children. Instructions for either direct shaping of social initiations or training peer confederates to initiate social interaction are described. Lesson cards illustrating activities to promote sharing, play assisting, play organizing and other social responses are included. A social assessment system is also built into the instructions and lesson cards. A cassette tape for timing observations accompanies the assessment system. A puppet ("Scippy") is included.

SPECIAL SERIES PROGRAMS

CAMS

17001 CAMS MANUAL $9.70

Provides an overview and explains the procedures for using the five curriculum programs. It also provides the placement tests, which must be administered to ensure that the child is placed at the appropriate level in the program, and photographs of children in the correct bodily positions for learning various skills.

17002 RECEPTIVE LANGUAGE PROGRAM. $9.70

Teaches skills that do not require the student to talk but are necessary in the understanding of oral language. Receptive language skills include identifying objects, following commands such as "come here" and "sit down", and touching body parts.

17003 EXPRESSIVE LANGUAGE PROGRAM $11.90

Teaches children general speaking skills, beginning with the formation of sounds and proceeding to teaching the child to speak in phrases and short sentences.

17004 MOTOR DEVELOPMENT PROGRAM $17.20

Designed to teach gross and fine motor skills to children, from birth to five years of age, who are primarily slow developers. This program stimulates normal motor development patterns, beginning with raising the head and proceeding through running, hopping, and drawing squares and diagonals.

17005 SELF HELP PROGRAM $16.80

Designed to teach skills usually acquired from birth to five years in the areas of feeding, dressing, personal hygiene, and toileting. Each skill is sequenced developmentally.

17006 SOCIAL-EMOTIONAL PROGRAM. $12.20

Teaches basic social-emotional skills to both normal and developmentally delayed children. The program, which is sequenced developmentally, begins with teaching a child to respond to a person and proceeds through teaching the child to handle frustration and exhibit self- control. Includes placement test, 40 objectives and teaching procedures and activities.

17007 CAMS SLIDE-TAPE KIT $32.50

Introduces the curriculum programs, teaches their use, and explains the simple system for scoring the child's responses.

17008 COMPLETE CAMS MANUALS $77.50
17009 COMPLETE CAMS SYSTEM. $115.00

*CAMS was developed and field-tested by the Exceptional Child Center; and is published and also distributed by Walker Educational book Corporation, 720 Fifth Avenue, New York, NY 10019. The kit can be ordered from either the Exceptional Child Center or Walker Educational Book Corporation.

CHILD ABUSE

18001 EDUCATIONAL AND PSYCHOLOGICAL PROBLEMS OF ABUSED CHILDREN $11.00

This is a doctoral dissertation research project examining the frequency that educational and psychological problems were present in a population of abused children. Along with this examination, the study investigated the frequency that abused children received speech therapy and psychological counseling, the frequency of institutional placement, the type and frequency of traits and behaviors which may be indicative of psychological problems, and academic achievement levels.

18002 CHILD ABUSE: AN INTEGRATION OF THE LITERATURE AND CONCEPT ANALYSIS WITH RECOMMENDATIONS FOR EDUCATIONAL RESEARCH $9.10

This research work presents an annotated bibliography for those interested in child abuse and/or the abused child. Further it presents a concept analysis of the child abuse problem.

18003 THE DEVELOPMENT AND VALIDATION OF AN INSTRUCTIONAL PACKAGE ON THE IDENTIFICATION AND REPORTING OF SUSPECTED CASES OF CHILD ABUSE AND NEGLECT $11.55

This study reports the development and validation of a two-unit instructional package dealing with physical child abuse (see this for package). The package was developed and validated using a modification of the research and development (R&D) process.

18004 PRIMARY PREVENTION OF CHILD ABUSE: IDENTIFICATION OF HIGH RISK ADOLESCENTS $4.40

This is a study describing the development and validation of an inventory that would identify adolescents in need of acquiring appropriate child rearing and parenting skills.

18005 EDUCATIONAL AND PSYCHOLOGICAL PROBLEMS OF ABUSED CHILDREN: A SUMMARY OF THE FINAL REPORT. . $1.50

This is a brief summary report of the problem, research, and conclusions found in the above

final report on Educational and Psychological Problems of Abused Children.

18006 TEACHER EDUCATION - AN ACTIVE PARTICIPANT IN SOLVING THE PROBLEM OF CHILD ABUSE AND NEGLECT?$1.50

Discusses research regarding the extent to which teacher education programs are or are not providing instruction in the area of child abuse and neglect. Makes some suggestions and recommendations in the training of teachers in this area, for the future.

18007 A MODEL CHILD ABUSE AND NEGLECT REPORTING POLICY AND PROCEDURE FOR USE BY UTAH SCHOOL DISTRICTS. $1.50

A brief outline of policy and reporting procedures in child abuse. Includes: responsibility for reporting, reporting procedure, policy implementation, sample reporting forms, and a listing of possible signs and symptoms of abuse and neglect.

18008 WHAT IS AN ABUSED OR NEGLECTED CHILD? . . . $1.10

A brief article defining and pointing out what abuse and neglect are. Some possible training ideas, and a short three rule listing of when to report a possible case of child abuse.

PEERS PROGRAM

18051 PEERS Pupils as Effective Educational Resources. $6.50

PEERS is a system for developing peer teaching capabilities of handicapped and nonhandicapped pupils. Instructions for training and managing peers are described. Also, diagrams and instructions for preparing a desk-top tutoring carrel are included. Instructional tasks which can be taught using flashcards or other stimulus cards are suitable for this peer teaching format. Spelling, simple mathematical operations, word recognition exercises, language development and other skills may be taught. Contents: Teachers Manual, Color bar progress graphs, (set of 10), tally sheets (set of 10).

20003 MANAGEMENT SYSTEM FOR SULLIVAN PROGRAMMED READING. $60.00

Designed for use with the 1968 version of Sullivan Programmed Reading, and based on a direct instruction approach. The purpose is to help a classroom teacher or resource room teacher organize an individualized system for teaching reading and keep track of each student's progress. Materials for the teacher include: a handbook, of complete directions, presentation books of the sounds and words to be taught, and a manual describing direct instructional teaching procedures. Materials for the student include: individual booklets of the sounds and words for every lesson and recordkeeping sheets. This package is only sold as a set, not in individual parts.

PLANNING, RECORD KEEPING, ASSESSMENT RESOURCES

PLANNING

20001 A PRIMER ON INDIVIDUALIZED EDUCATION PROGRAMS FOR EXCEPTIONAL CHILDREN (Foundation for Exceptional Children Publication). $5.00

This book presents workable suggestions and "best practices" regarding I.E.P. development, implementation, and evaluation.

20002 INDIVIDUALIZED EDUCATIONAL PROGRAM FORMS . .$ .60

This is the set of forms included in the above package. They can be bought separately if desired. This set of four forms will help to make I.E.P. writing easier and more defined. It will cut down on your paper work while clarifying exactly what the individualized educational program contains. It meets all the requirements of the law (Public Law 94-142) and maked it easier to implement. Set of 25. . . . . $1.95

20009 BEST PRACTICES MANUAL $40.00

This manual was developed at the Exceptional Child Center to put together in written form the best practices currently available for working with handicapped children.

This manual describes the model program presently in operation at the Exceptional Child Center, Utah State University, Logan, Utah. The purpose of describing the various components of the model (e.g., the demonstration classrooms, curriculum procedures for developing IEP's, and behavior management techniques, to name but a few) is to provide both the teachers and paraprofessional with a comprehensive source for the

"best practices" established while this program was being developed. Contents of the manual include:

1. Purposes and components of the Best Practices Manual
2. Educational Services Staff
3. Classroom Organization and Operation
4. Developing, implementing, evaluating, and monitoring the Individualized Education Plan
5. Individual and group planning
6. Institutional data collection and analysis
7. Teacher power and the modification of classroom behavior
8. Curriculum
9. Paraprofessional training and use
10. The parents role in the education of their child
11. The roll of the consultant in the classroom

20010 THE INDIVIDUAL ASSESSMENT AND CURRICULUM SYSTEM $9.50

The Individual Assessment and Curriculum System (IACS) is a planning instrument which was designed for use by all persons who work with handicapped students. The IACS can be used as an assessment tool for determining the specific behavioral skills and deficits of the handicapped students. The results can then be used for planning the student's program. Thereafter, it can be used as a short or long-term record for monitoring student progress. Second, the IACS can be used as a curriculum guide or resource for planning programs for individual children whose skill and deficit behaviors have already been determined on the basis of IACS assessment or from assessments using other instruments. Third, the IACS can be used for planning the training programs for those individuals who will work with handicapped students, e.g., special education students, volunteers, and classroom aides. The IACS consists of objectives, developmental ages, a list of resources, Student Profile sheets, and a Student Profile graph.

RECORD KEEPING

20005 MULTIPLE TRACKING GRAPHS $2.95

A graph designed to assist teachers in monitoring student behaviors across a broad range of IEP's or IHP's. With each graph the teacher/trainer can track multiple behaviors or shorterm objectives, which relate to the same long term goal. This visual display can also be sent to parents, or educational personnel as a report on student progress. A total of eight behaviors can be monitored on each multiple tracking graph sheet. Instructions for plotting different behaviors and measurements are included. Pad of 75.

20004 DAILY/WEEKLY TALLY SHEETS. $2.95

This is a pad of 75 sheets. The sheets were designed for teachers who are experiencing difficulty in trying to organize and keep records across a number of different skills and instructional materials, particularly where the student makes no written product to score. The tally sheet aids teachers in recording results of daily teaching and testing activities for a one week period. A "Percent Finder" and "Rate Finder" on the back of each sheet helps to quickly summarize tallys. It can be used to (a) assist in tests and probes of student performance, (b) summarize daily workbook (or workpage) performance,(c) record daily tutoring sessions, and (4) implement Individualized Education Programs. These sheets can be used across subject areas, including: reading spelling, math, handwriting, language and development, and self-help skills. Pad of 75.

20011 INSTRUCTIONAL MATERIALS FOR EXCEPTIONAL CHILDREN: SELECTION, MANAGEMENT & ADAPTATION (Aspen Systems Publication). $21.00

A reference book for teachers media/materials specialists and librarians. Focused on concrete procedures for locating, evaluating and modifying available instructional materials. Procedures of using many of the products listed in this catalog are described or illustrated in the book.

ASSESSMENT RESOURCES

20007 DIAGNOSTIC ARITHMETIC COMBINATIONS TEST . . $2.75

Diagnoses deficiencies in accuracy and speed of addition, subtraction, multiplication, and division combinations. Can be used as a duplicating master (for "quickie" dittos).

20008 DIAGNOSTIC CAPITAL LETTERS AND PUNCTUATION TEST. $2.75

A criterion-referenced test designed to diagnose learning deficiencies in punctuation. Probably best suited for grades 2-7, although older children needing a remedial program could use it. Can be used as a duplicating master (for "quickie" dittos).

PARENT INFORMATION RESOURCES

19001 WHAT DO I DO NOW? $2.50

Practical advice on how to deal with the problems of child misbehavior. This is a useful handbook to help parents replace misbehavior with good b -vior. Specific examples are given to teach such desired behaviors as sharing, paying attention, and picking up toys; and to eliminate undesirable behaviors such as arguing, hitting, and tantrums.

19002 PARENT GUIDE TO PACKAGES. $2.20

This guide assists parents in selecting appropriate teaching materials for their handicapped child, in certain self-help skill areas. It also provides an orientation to the skills needed for productive parent instruction. Specific information on how to keep track of the child's progress is presented in detail. Possible problem areas a parent may encounter while teaching are reviewed, along with suggested solutions.

19003 RESOURCE DIRECTORY: SERVICES FOR THE HANDICAPPED $4.95

Gives a cross-referenced listing of services for the handicapped in the state of Utah. Some of the listings include: counseling, health care, group homes, institutions, hospitals, and many others.

19007 PARENT RESOURCE LIBRARY CATALOG $1.10

A catalog of materials available from the Parent Resource Library at the Exceptional Child Center. Books include topics on many types of handicapping conditions, as well as behavior management skills and techniques to be used with all children. No charge to parents of handicapped children in Utah, Idaho, Wyoming and Nevada.

19008 PARENT RESOURCE LIBRARY INFORMATION CATALOG $5.00

A comprehensive computer printout catalog of all books and pamphlets in the Parent Resource Library. Each book listed is accompanied by information needed to order the book from the publisher, as well as information describing the book and its contents. This catalog will be of interest to parents wishing to purchase books for their own use and to professionals interested in establishing their own Parent Resource Libraries.

19009 PARENT RESOURCE LIBRARY PROCEDURAL MANUAL. .$4.15

An outline of procedures followed in setting up a Parent Resource Library. It is meant to be used with the Information Catalog as a guide in creating other Parent Resource Libraries in educational institutions, regional centers, public libraries, school districts, etc. that have contact with parents of handicapped children.

19010 BALANCED NUTRITION AND EXERCISE. $4.95

Information on providing nutritious food. Includes suggestions on how to increase exercise and what to do if your child is overweight. Also recipes for meals.

20006 EDUCATING THE MILDLY HANDICAPPED $7.15

This book (used for a textbook in many college classrooms) provides an overview of issues related to the diagnosis and treatment of children who carry labels of "learning disabled," "Mildly emotionally disturbed," "educable mentally retarded, and "hyperactive". Some of the topics covered include: task analysis, categorization pros and cons, teaching and remediating concepts, issues in diagnosis and treatment, resource teaching, issues in testing, criterion-referenced testing, paraprofessionals and tutoring, and behavior management.

TRAINING PROGRAMS for PROFESSIONALS, PARAPROFESSIONALS and PARENTS

The following programs are designed for training of many varying groups of individuals. They can be used as in-service training for parents, teachers, paraprofessionals, and professionals. They are applicable in homes, institutions, and educational settings. They are very useful as part of a library in schools, universities, and training centers. Each program contains both instructor and student manuals, tapes and slides and in some cases sample questions and answers for testing.

21001 PARENT TRAINING PROGRAM - LATHAM $350.00

The program is divided into four presentations:

Unit 1: Behavior: Emphasizes the analysis of complex behaviors and the synthesis of simple behaviors into an instructional sequence.
Instructional time: 100 minutes.

Unit 2: Cues: From observing the child you can identify a complex behavior, analyze it, pinpoint the step-by-step simple behaviors, and then attach a child's cue to each simple behavior.
Instructional time: 95 minutes

Unit 3: Reinforcement: Indentification and action of reinforcers is covered in detail. The parent practices the pairing and fading of reinforcers with the behavior chains prepared in preceding units.
Instructional time: 100 minutes

Unit 4: Programming and Recordkeeping: Integrates all the preceding units by stressing the systematic monitoring of behavior using simple charting procedures. These monitoring skills are used to determine entering skills, follow progress through a task sequence, and assess the effect of "reinforcers."

The four slide-sound units described above can be presented several days apart to allow students to apply the instructional skills taught by the presentations to their handicapped child. This program can be used with inservice training for professionals and paraprofessionals as well as parents. Program includes 7 slide carousel trays, 1 monitor's manual, 10 participant's manuals, and 5 audio cassette tapes.

21002 Additional Participant's Manuals $3.75
21003 Additional Monitor's Manuals $7.50

21004 CLINICAL SYNDROMES OF MENTAL RETARDATION - ATKINSON. $150.00

This product is intended for use by professionals and paraprofessionals. Includes in-depth discussion of mental retardation syndromes and may be too technical for some parents or nonprofessionals. A self-contained package consisting of a monitor's manual, 10 student workbooks, audiotapes, and slides. The following units are included to make up the total package:

Unit 1: Chromosomal Aberrations - Down's Syndrome, Klinefelter's Syndrome, Turner's Syndrome.

Unit 2: Specific Defective Genes - Neurofibromatosis, Tuberous Sclerosis, Phenyiketonuria, Hurler's Disease.

Unit 3: Skull and Brain Anomalies - Microcephaly, Hydrocephaly, Spina Bifida.

The three units may be covered without a monitor; however, it is felt that the use of a monitor with discussion following each unit is beneficial. Additionally, the program is best utilized in graduate courses. Each participant is given a response manual, which is retained after the presentation as a reference guide. Audio portions of each unit are recorded on a separate audio cassette tape. The narration instructs the participant when to respond in his manual and when to turn off the recorder if the activities are lengthy. Each unit consist of approximately 70 slides for the slide-sound presentation and 10 slides for pre- and post-testing. Instructional time is about 60 mintues per unit. The Clinical Syndromes Program contains 10 participants' manuals, one monitor's manual, 3 cassette tapes, and 3 carousel slide trays.

21005 Additional Participant's Manuals $2.25
21006 Additional Monitor's Manuals $6.50

21007 PRENATAL CARE TRAINING PROGRAM - HAGAN . $200.00

This is intended for use in Prenatal Care classes, High School Health Programs, Waiting Rooms and Related Education Classes. Developed to prevent birth defects from occurring and to provide information on having healthy children. This mediated training program is designed to teach specific objectives related to good prenatal care. The program consists of five units:

Unit 1: Prevention of Birth Defects: Information is provided which can help individuals prevent various types of birth defects and understand why birth defects occur.

Unit 2: Nutrition: Explains what can happen to the fetus when a good diet is not provided for the mother. The various food groups are explained, as well as the different types of food they represent.

Unit 3: Heredity: Deals with genes and chromosomes, how they develop, and birth defects related to hereditary problems. Genetic counseling is also discussed as it pertains to the prevention of genetic difficulties.

Unit 4: Environmental Factors: Deals with birth defects as they relate to drugs, radiation, and infections. Prematurity and its cause is also d scussed.

Unit 5: Contraception: Discusses the most common types of contraceptives, how they work, and their effectiveness. Complications and side effects are also discussed.

21008 Additional Monitor's Manuals. $7.50
21009 Additional Participant's Manuals. $6.25

21010 CHILD ABUSE AND NEGLECT: IDENTIFICATION AND REPORTING $50.00

A self-contained unit designed to explain and instruct on child abuse and neglect identification and reporting. Includes two units, each with separate carousel, tape, and instructional booklet.

Unit 1: Identification of Child Abuse - Instructs the student to define and categorize the abused or neglected child. To be able to discriminate between critical or insufficient cases. The objective is to teach the learner to identify an abused or neglected child when confronted in a classroom or institutional setting.

Unit 2: Reporting Child Abuse & Neglect: Instructs the student in the steps required to report a suspected case of child abuse or neglect. Covers the major points in the Utah state Child Abuse Statues. Also includes case study form, examples, and agencies that deal with these cases. The objective is to enable the student to correctly report the facts to the appropriate authorities.

Teaching Proficiency Workshops

A generic teaching skills workshop for special and regular educators. Focus is on reading mathematics and spelling skills of children. Content ranges from 1 day workshops to a complete course. Provides an interactive multimedia format, followed by simulations, micro- teaching experiences and followup in basic planning, measurement and direct instruction competencies applied to the educational problems of handicapped children. Training can be conducted by school-based personnel or contracted independently for.

21011 Complete Workshop $325.00
- 11 slide/sound units
- Masters for participants' test
- Masters for workshop handouts
- Coordinator's manual
- Masters for How to Followup Booklet
- 1 Skills Profile Chart set
  1 Tallysheet

21012 Planning workshop (2 days). $165.00
- Curricular Analysis
  (2 slide/sound Participants' booklet sets, 12 sets of Skill Profile Charts)
- Task Analysis
- (2 slide/sound/participant's booklet sets) - Specifying Objectives simulation (handout masters)
- Prerequisites and sequencing simulation (handout masters)

21013 Direct Teaching Workshop (1 day). $125.00
- Modeling Tactics
  2 slide/sound participant's booklet sets, simulation handout masters)
- Questioning tactics
  (participants' book)
- Contingent Teacher Attention tactics
  (1 slide/sound participant's booklet set, contingency game, handout masters)
- How to Microteach booklet

21014 Measurement Workshop (1 day) (should follow Planning Workshop) $95.00
- Educational Measurement and Diagnosis (2 slide/sound/participant's booklets sets)
- Monitoring Educational Progress (participants' booklet)
- Tallysheet pad (75 sheets)

Video Training Workshops

The following video training products were designed to be used as a workshop. Products contain: the video tape presentation, Participants Manual, Coordinator's Manual, and Test Cards.

24001 ASSESSMENT OF ADAPTIVE BEHAVIOR - PRESENTED BY ALAN M. HOFMEISTER (20:25)

This session will focus on the rationale for assessing the adaptive behavior of the mentally retarded as a means for evaluating intelligence. Several assessment instruments are described in the video presentation and the participant's manual. The video-tape and practice exercises for this session, however, will focus on the administration, scoring, and interpretation of the AAMD Adaptive Behavior Scale.

Tape (20 min.). $25.00
Participant's Manual. . . . . .$ 3.55
Coordinator's Manual. . . . . .$ 4.75
Test Cards (each) . . . . . .$ .15

24002 TRAINING PARENTS IN BEHAVIOR MANAGEMENT PRESENTED BY GLENN LATHAM (Part 1 28:37 Part 2 56:10)

This session has been designed to provide a brief introduction to some of the important considerations in training parents of handicapped children in behavior management techniques in the home. The session will cover two general areas. The first of these will discuss salient aspects to train parents in management by parents in the home, criteria and considerations for the selection of appropriate problem behaviors to be managed, and the need to acquire commitment from the parents to the systematic management of selected behaviors.

The second general area covered is the actual training of parents in behavior management techniques. Some considerations included here are: means of acquiring parent commitment to the training, important components and considerations in providing preservice training provided in the

home, and making use of available published resources related to parent training and management of behavior in the home.

Tape #1 (30 Min.) $25.00
Tape #2 (57 Min.) $32.00
Participant's Manual. . . . . .$ 2.20
Coordinator's Manual. . . . . .$ 3.05
Test Cards (each) . . . . . .$ .15

24003 BEHAVIOR MANAGEMENT PRESENTED BY GLENN LATHAM (Part 1 62:58, Part 2 1:15)

This session discusses the use of behavior modification for the management of behavior. It includes a definition and description of behavior modification (operant conditioning) and the four basic components necessary for it's success: 1) careful identification of the behavior to be managed, 2) a set of cues related precisely to the behavior to be managed, 3) use of a reinforcement system that is compatible with the subject, 4) use of a record keeping system that details precisely the direction and magnitude of the behavior being managed. Demonstrations of the technique and all its components are included and several resource materials are described.

Tape #1 (63 min.) $32.00
Tape #2 (1:15 min.) $25.00
Participant's Manual. . . . . .$ 2.60
Coordinator's Manual. . . . . .$ 3.35
Test Cards (each) . . . . . .$ .15

24004 ORIENTATION TO MENTAL RETARDATION/ DEVELOPMENTAL DISABILITIES - PRESENTED BY CAROL J. ANDERSON

This session provides a brief orientation to developmental disabilities and retardation. It will include a basic description of each condition and briefly touch on several important aspects of both to provide participants with some of the essential information related to these conditions.

Tape #1 (62 mins.). $32.00
Tape #2 (0:59 min). $25.00
Participants Manual . . . . . .$ 3.15
Coordinator's Manual. . . . . .$ 3.65
Test Cards (each) . . . . . .$ .15

24005 DEVELOPING TREATMENT PLANS - PRESENTED BY GLENDON CASTO (32:35)

This session has been designed to introduce professionals dealing with developmentally disabled clients to the procedures used in developing individual treatment plans. The rationale behind the adoption of this approach is provided and common questions asked by caseworkers are addressed.

Tape (32:35). $32.00
Participant's Manual. . . . . .$ 2.75
Coordinator's Manual. . . . . .$ 3.45
Test Cards. . . . . .$ .15

24006 LEGAL CONSIDERATIONS IN WORKING WITH MR/DD CLIENTS - PRESENTED BY GORDON ESPLIN (45:55)

This session has been designed to touch on several of the legal concerns to be taken into consideration by professionals working with mentally retarded/ developmentally disabled individuals. Four basic topics have been identified and discussed in relation to legal concerns, rights and responsibilities of the handicapped in the following areas: substitute decision making including guardianship; trusts and other mechanisms; standards and procedures for receiving supplemental security income; laws pertaining to the educational rights of the handicapped; and confidentiality and accessibility of various educational, medical, and government records.

Tape (46 min) $32.00
Participant's Manual. . . . . .$ 3.75
Coordinator's Manual. . . . . .$ 4.85
Test Cards (each) . . . . . .$ .15

24007 PRESCHOOL MR/DD PROGRAMMING - PRESENTED BY VONDA DOUGLASS (58:45)

This session is designed to introduce issues and procedures that are relevant in providing programs to mentally retarded/developmentally delayed preschool children. Assessment, program implementation, monitoring, and evaluation will be covered.

Tape (59 min.). $32.00
Participant's Manual. . . . . .$ 3.25
Coordinators Manual . . . . . .$ 3.75
Test Cards (each) . . . . . .$ .15

24008 INTERPRETATION OF ASSESSMENT REPORTS - PRESENTED BY CAROLINE N. PRESTON (Part 1 61:58, Part 2 27:40)

This session is designed to provide information which can assist the practitioner in making appropriate individual planning decisions. The video-tape includes a simulated conference with a multi-disciplinary assessment team, several considerations in effective interpretation of assessment reports are introduced. Information which can be derived from assessments, commonly used tests, questions which should be answered and caution to be exercised when using assessment information are discussed.

Tape #1 (62 min). $32.00
Tape #2 (28 min). $25.00
Participant's Manual. . . . . .$ 5.00
Coordinator's Manual. . . . . .$ 5.75
Test Cards (each) . . . . . .$ .15

24009 COUNSELING PARENTS AND SIBLINGS OF MR/DD CLIENTS - PRESENTED BY LEON SODERQUIST (Part 1 60:40, Part 2 50:20)

This session addresses three major areas of concern when counseling parents and siblings of handicapped children; the stages of adjustment through which parent and siblings may pass, the process involved in working through the tasks in each stage and counseling needs in each stage. Each stage will be defined and ways in which people work through the tasks of each stage or get trapped in the process will be discussed in detail.

Tape #1 (61 min.) $32.00
Tape #2 (51 min.) $32.00
Participant's Manual. . . . . .$ 4.50
Coordinator's Manual. . . . . .$ 6.70
Test Cards (each) . . . . . .$ .15

19001 WHAT DO I DO NOW? $2.50

For description see Parent Information Resources

20009 INSTRUCTIONAL MATERIALS FOR EXCEPTIONAL CHILDREN: SELECTION, MANAGEMENT & ADAPTATION (Aspen Systems Publication). $19.00

For description see Planning, Recordkeeping, Assessment Resources

RECREATION I. $6.00

For description see Social/Leisures Skills

12009 RESOURCE BOOK: A PROGRAM FOR THE CHILD WITH HANDWRITING PROBLEMS $5.50

For description see Academics Packages

19003 RESOURCE DIRECTORY: SERVICES FOR THE HANDICAPPED $4.95

For description see Parent Information Resources

MATERIALS for DEVELOPMENTALLY DELAYED ADULTS

25001 DEVELOPMENTAL DISABILITIES AND GERONTOLOGY: PROCEEDINGS OF A CONFERENCE $15.55
This text was developed as a product of the National Conference on Developmental Disabilities and Gerontology (1975). Contents of this publication include: 1) Reports from five Projects on the Aged/DD; 2) Reports on: Terminology and Service needs, obstacles to needed services and model of service; and 3) Issues concerning the delivery of services from a national perspective.

25002 DOUBLE JEOPARDY: THE PLIGHT OF THE ELDERLY DEVELOPMENTALLY DISABLED PERSONS IN MID-AMERICA $17.00

This research monogrpah is a collection and interpretation of data on services to aging and aged, developmentally disabled persons in six midwestern states.

TECHNICAL PAPERS - AGING & AGED DD ADULT

25003 BIBLIOGRAPHY CONCERNING ADULT AND AGING DEVELOPMENTALLY DISABLED INDIVIDUALS - Technical Paper #1 . . . . . .$ .55

25004 THE OREGON A.D.D. POPULATION: GETTING IT ALL TOGETHER FROM A DATA BASE - Technical Paper #2 . . . . . $ .55

25005 AGING AND THE AGED PROFOUNDLY RETARDED - Technical Paper #3 . . . . . .$ .55

25006 SERVING AGING AND AGED DEVELOPMENTALLY DISABLED PERSONS - Technical Paper #4 . . . . . .$1.75

15007 OLDER DEVELOPMENTALLY DISABLED PERSONS, A SURVEY OF IMPAIRMENTS - Technical Paper #5. . . . .$ .85

25008 LEISURE ACTIVITIES & THE AADD POPULATION - Technical Paper #6. . . . . $1.20

25009 RESOURCE BIBLIOGRAPHY - COMMUNITY BASED TEMPORARY FAMILY SUPPORTS AND INTEGRATED RESPITE SERVICE SYSTEMS - Technical Paper #7. . . . . $1.20

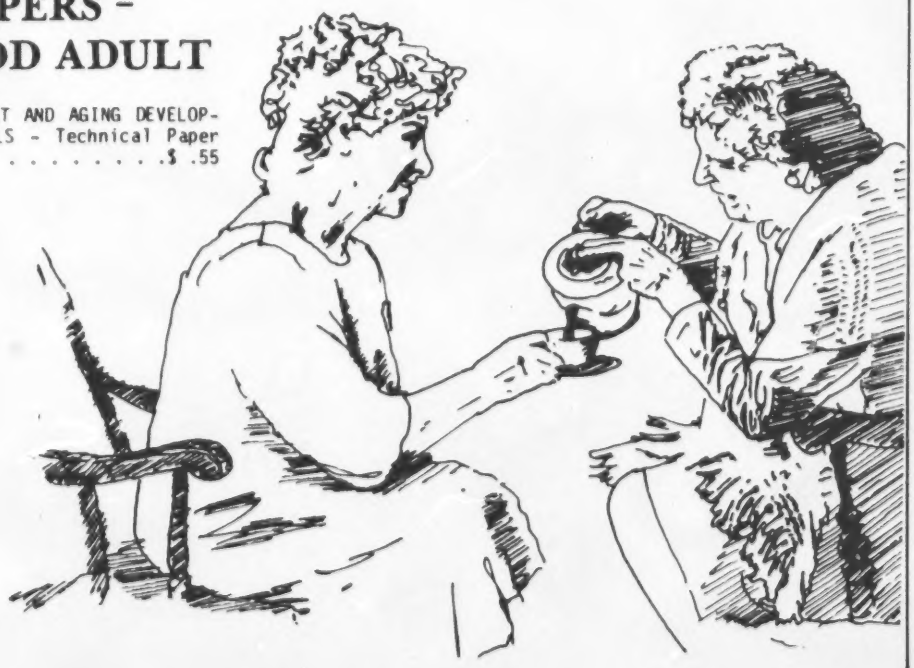
25010 OLDER DEVELOPMENTALLY DISABLED PERSONS: AN INVESTIGATION OF NEEDS AND SOCIAL SERVICES - Technical Paper #8 . . . . . .$ .80

25011 THE GEORGIA EXPERIENCE - Technical Paper #9. $.35

25012 THE SERVICES HASSLE FROM ONE CONSUMER'S EXPERIENCE (MID-LATE 1970's): EXAMINING SOME CURRENT PUBLIC SERVICE MODELS - Technical Paper #10 $.25

25011 COMBATTING REGRESSION: AN EDUCATIONAL APPROACH TO THE NEEDS OF THE AGING AND AGED DEVELOPMENTALLY DISABLED - Technical Paper #11 . . . . . $ .50

25013 EXISTENCE SKILLS AND THE AADD POPULATION - Technical Paper #12. . . . . .$ .25



MINI POSTERS!

These posters (8 1/2 X 11) contain concise illustrated information important to home, hospital, school, institution, and parent groups. They can be posted on walls, the home refrigerator, handed out in information meetings, reproduced in parent newsletters, plus many other innovative uses.

22001 PREVENTING BEHAVIOR PROBLEMS

This poster covers 5 basic principles: catch the child behaving, be specific in your praise, praise and reward immediately, be consistent, and praise and reward small steps.

22006 HANDLING BEHAVIOR PROBLEMS

A quick reference for the parent or teacher on 4 basic behavior principles: ignore misbehavior, make a "quiet area", set conditions, and make effective demands. Each principle is described and illustrated.

22011 FOCUSING ATTENTION

Gives 4 conditions and 4 teaching steps to help teach your child how to focus his attention. The ability to focus attention is often necessary before many other learning activities can take place.

22016 PARENT'S AND I.E.P.'S

This quick guideline explains the I.E.P. (Individual Education Plan) in language that everyone can udnerstand. It gives the parent suggestions for involvement in their child's individual education plan.

22021 KEEPING TRACK OF YOUR CHILD'S PROGRESS

This poster gives several ideas on recordkeeping and important progress signals to help keep track of your child's progress and make his learning a success.

22026 FIRST AID: TREATMENT FOR CHOKING

This poster illustrates the 3 methods of treatment for choking: Clear airway, Heimlich maneuver with victim standing, and Heimlich maneuver with victim lying down.

22066 WHAT TO KNOW BEFORE YOU GO TO YOUR I.E.P. SESSION

This phamphlet is designed to prepare parents for their child's Individual Educational Placement meeting. It provides suggestions on what should be done prior to the meetings, for example, write down what your child can do. Additionally, suggestions are given in things that parents can do at the meeting, for example: making sure that the goals and objectives are clear cut and specific.

22071 YOU AND ONE FOUR TWO! PUBLIC LAW 94.142.

The purpose of this pamphlet is to assist parents and educators in becoming more familiar with Public Law 94.142. It contains a self quiz in the law with answers.

22031 HOW IS YOUR CHILD FEELING?

This poster focuses on eight areas which should be considered if your child is ill. Provides information on: temperature, heart rate and when an ambulance should be called.

22036 NUTRITION

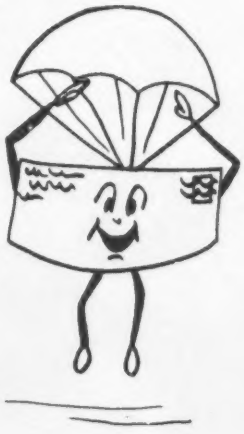
This handy reference helps one to remember the most important components of good nutrition. It decribes the basic four food groups and lists 7 general suggestions related to eating habits and food preparation.

22041 BALANCED DIET - DIETARY

Modification for acute diarrhea suggestions are presented on foods to avoid, foods to consume, and menu to follow, when a child has diarrhea. General rules to consider in the control of diarrhea are also given.

22040 BALANCED DIET - FOOD

Remedies for constipation ideas are outlined for the treatment of constipation in children.



22051 BREATHING FOR OTHERS

Describes and illustrates each step requiring mouth to mouth resuscitation. An all-important poster to have posted in the home and class.

22056 IMMUNIZE

Immunizations are required by law in most states. This handy one page record lists the 8 immunizations most children should have, along with the procedure in getting the shots, at what age they should be given, when boosters are required and the length of protection of the shots.

22061 PROTECT YOUR BACK: USE CORRECT POSITIONING

The parents and helpers of the handicapped often encounter back problems. This poster explains the importance of good posture, and give correct and incorrect examples of: standing, lifting, pushing, pulling, driving, etc. It is a quick wall reference that could help relieve and prevent back pain.

These mini-posters come in colored paper and can be purchased singly, in lots of 15, or in lots of 25 or 100.

Single Posters	$ .20
Set of 15 Posters	2.75
Lot of 25 Posters	4.25
Lot of 100 Posters	15.00

TECHNICAL PAPERS

The following list of technical papers are research and training papers written and developed by staff members and consultants at the Exceptional Child Center. Each paper presents important concepts in research and training.

23001 EDUCATIONAL TRENDS AND SPECIAL EDUCATION - HOFMEISTER . . . . . $ .35

*Reprinted from: Slow Learning Child, 1969, 16(2), 267-272.

23002 PROGRAMMED INSTRUCTION REVISITED: IMPLICATIONS FOR EDUCATING THE RETARDED - HOFMEISTER. . .$ .30

*Reprinted from: Education and Training of the Mentally Retarded, 1971, Vol. 6, 172-176,

23003 LET'S GET IT WRITE - HOFMEISTER . . . . . $ .25

*Reprinted from: Teaching Exceptional Children, Fall, 1973, 6(1), 30-33.

23004 INTEGRATING CRITERION TESTING AND INSTRUCTION - HOFMEISTER. . . . . $ .60

*Paper presented at the University of Minnesota Institute, "Taking the Wraps Off Testing," July 23-25, 1973.

23005 PACKAGES FOR PARENT INVOLVEMENT - HOFMEISTER, REAVIS. . . . . $ .25

*Reprinted from: "Learning Packages for Parent Involvement," Educational Technology, 1974.

23006 CRITIQUE: TEXAS SENSORI-MOTOR TRAINING PROJECT - HOFMEISTER. . . . . $ .35

*Reprinted from: "Texas Sensori-Motor Training Project." The Slow Learning Child, Nov. 1974, Vol. 21, no. 3, 178-184.

23007 A REVIEW OF NUTRITIONAL FACTORS IN MENTAL RETARDATION - MAHONEY, BROWN. $2.75

23008 PARENT TRAINING PACKAGES - STOWITSCHEK, HOFMEISTER. . . . . .$ .35

*Reprinted from: Children Today, Mar-Apr 1975, 4(2), 23-25.

23009 PACKAGED HOME INSTRUCTIONAL MATERIALS FOR PARENTS OF THE SEVERELY HANDICAPPED: A CONCEPT ANALYSIS - STILE, ATKINSON. . . . . .$ .30

*Paper presented at the 26th Annual CSF/CEC Conference, San Francisco, November 1, 1976.

23010 INDIVIDUAL TEST ADMINISTRATION TECHNIQUES FOR PRESCHOOL AND HANDICAPPED CHILDREN - FIFIELD $.30

23011 COMBATTING REGRESSION: AN EDUCATIONAL APPROACH TO THE NEEDS OF THE AGING AND AGED DEVELOPMENTALLY DISABLED - GALLERY, HOFMEISTER, LATHAM. .$ .40

*Reprinted from ASET Journal, Vol. 1, 1978.

23012 THE PARENT IS A TEACHER - HOFMEISTER. . . . $ .90

*A paper presented at the 56th Faculty Honor Lecture, Utah State University, Logan, Utah. November 1977.

23013 PROJECT TELEPAC: A PROTOTYPE EDUCATIONAL SERVICE DELIVERY MODEL FOR SEVERELY HANDICAPPED CHILDREN IN RURAL AND REMOTE AREAS - HOFMEISTER. . . $ .35

23014 THE FUTURE OF COMMUNITY RESIDENTIAL CARE - BUFFMIRE . . . . . .$ .75

23015 WHAT DIRECTIONS SHOULD RESEARCH TAKE IN DEVELOPING EDUCATIONAL PROGRAMS FOR THE SEVERELY HANDICAPPED - HOFMEISTER . . . . . $ .90

*Reprinted from: Instructional Technology and the Education of All Handicapped Children (Paper 17). In R. Heinich and S.C.Ashcroft (Eds.). Columbus: National Center on Educational Media and Materials for the Handicapped, 1977.

23016 INTRODUCTION TO MENTAL RETARDATION: PLANNING, IMPLEMENTING AND EVALUATING TRAINING FOR PARAPROFESSIONALS AND/OR SURROGATE PARENTS - HERTLEIN, KONOPASEK, STILE $1.00

*Paper presented at the 55th Annual International convention of the Council for Exceptional Children, Atlanta, Georgia, April 14, 1977.

23017 METHODS OF DIRECT BEHAVIORAL OBSERVATION - ASCIONE $1.35

23018 ON BEING THE FATHER OF A HANDICAPPED CHILD - LATHAM. . . . . $ .35

23019 USING OBSERVATION INSTRUMENTS FOR THE PREPARATION AND SUPERVISION OF TEACHERS - COLE, KITANO, RICKERT . . . . . $ .60

*Reprinted from: Teacher Education and Special Education, Spring 1978, Vol. 1., No. 2, 40-47.

23020 PARENTAL INVOLVEMENT IN SPECIAL EDUCATION: RIGHTS AND RESPONSIBILITIES - HOFMEISTER, GALLERY . . . . . $ .30

*Reprinted from: National Easter Seal Society for Crippled Children and Adults Information Library.

23021 DEVELOPMENT AND VALIDATION OF A MEDIATED PACKAGE FOR TRAINING PARENTS OF PRESCHOOL MENTALLY RETARDED CHILDREN - HOFMEISTER, LATHAM. . . . $ .30

*Reprinted from: Improving Human Performance: A Research Quarterly, March 1972, I(1), 3-7.

23022 MANAGEMENT OF PROBLEM BEHAVIOR THROUGH PEER SOCIAL REINFORCEMENT - HENDERSON AND BINGELL .$ .25

23023 AUDIO-TUTORIAL PROGRAMMING WITH EXCEPTIONAL CHILDREN - HOFMEISTER . . . . . .$ .35

*Reprinted from: Educational Technology, December 1973, XIII (12), 50-52.

23024 TWO APPROACHES TO HANDWRITING INSTRUCTION - STEWART. . . . . .$ .50

*Reprinted from: The Slow Learning Child, 1973.

23025 EFFECTS OF MINICOURSE INSTRUCTION ON TEACHER PERFORMANCE AND PUPIL ACHIEVEMENT - STOWITSCHEK, HOFMEISTER. . . . . $ .50

*Reprinted from: Exceptional Children, April 1974, 40(7), 490-495.

23026 MEASURING TEACHER RESPONSES TO INSTRUCTIONAL MATERIALS - LATHAM. . . . . $ .40

*Reprinted from: Educational Technology, December 1974, 11-15.

23027 SPECIAL EDUCATION IMC/LRC SERVICES: THEIR USE BY TEACHERS OF THE HANDICAPPED - LATHAM. . . . $ .60

23028 THE USE OF OMISSION TRAINING TO REDUCE SELF-INJURIOUS BEHAVIOR IN A RETARDED CHILD - WEIHER, HARMAN. . . . . $ .50

*Reprinted from: Behavior Therapy, 1975.

23029 EFFECTIVE USE OF OBJECTIVES AND MONITORING - CRUTCHER, HOFMEISTER . . . . . .$ .30

*Reprinted from: Exceptional Children, 1975.

23030 WORK SIMULATION: AN APPROACH TO VOCATIONAL EXPLORATION - AINSWORTH, FIFIELD . . . . . $ .40

23031 USING THE E-B PRESS TUTORIAL SERIES IN THE ELEMENTARY EMOTIONALLY HANDICAPPED CLASSROOM - WINGERT . . . . . $ .60

23032 ARE NUTURANCE AND THE SATIATION OF SOCIAL REINFORCERS EQUIVALENT OPERATIONS? - ASCIONE, COLE . . . . . .$ .50

*Reprinted from: The Journal Press, April, 1977.

23033 THE EFFECTS OF CONTINUOUS NURTURANCE AND NURTURANCE WITHDRAWAL ON CHILDREN'S BEHAVIOR: A PARTIAL REPLICATION - ASCIONE . . . . . .$ .50

*Reprinted from: Child Development, 1975.

23034 PROJECT TELEPAC: THE TELEPHONE AS AN INSTRUCTIONAL COMMUNICATION DEVICE FOR PARENTS OF HANDICAPPED CHILDREN AND YOUTH - HERTLEIN. . . . $ .25

*Paper presented at the 54th Annual International Convention of the Council for Exceptional Children, Chicago, April 1976.

23035 RELATIVE EFFICACY OF TWO TOKEN ECONOMY PROCEDURES FOR DECREASING THE DISRUPTIVE CLASSROOM BEHAVIOR FOR RETARDED CHILDREN - BAER, ASCIONE, CASTO $.60

23036 EDUCATIONAL SERVICES TO HANDICAPPED CHILDREN OF HISPANIC AND NATIVE AMERICAN DESCENT - FIFIELD . . . . . $ .90

23037 AN OUTLINE AND HISTORICAL OVERVIEW OF DEVELOPMENTAL DISABILITIES: NORMALIZATION, ALTERNATIVE TO INSTITUTIONAL LIVING, AND CITIZEN ADVOCACY - ZAUGG, FIFIELD $1.35

23038 SOCIAL REINFORCER SATIATION: AN OUTCOME OF FREQUENCY NOT AMBIGUITY - SOMETIMES - BARTON, ASCIONE $1.10

*Reprinted from: Developmental Psychology, Vol. 14, July 1978.

23039 JOB SIMULATION - A METHOD OF VOCATIONAL EXPLORATION - FIFIELD . . . . . .$ .60

23040 BEHAVIORALLY DISORDERED ADOLESCENTS AS PEER TUTORS: IMMEDIATE AND GENERATIVE EFFECTS ON INSTRUCTIONAL PERFORMANCE AND SPELLING ACHIEVEMENT - STOWITSCHEK, HECIMOVIC, STOWITSCHEK. . . $1.20

23041 SYSTEMATICALLY PRODUCED INTERVENTION STRATEGIES IN EARLY EDUCATION - CASTO, BAER, HOAGLAND, PETERSON. . . . . .$ .40

*Reprinted from: ASET Journal, Vol. 1, 1978.

23042 A METHOD FOR ASSESSING THE TREATMENT VALIDITY OF TESTS IN SPECIAL EDUCATION - GALLERY, HOFMEISTER . . . . . $ .40

23043 INCREASING PARENT INVOLVEMENT - PORCELLA . .$ .15

23044 THE EFFECTS OF REDUCED TIME LIMITS ON PROLONGED EATING BEHAVIOR - SANOK, ASCIONE . . . . . .$ .40

23045 LONGITUDINAL CURRICULUM DEVELOPMENT AND ONE CURRICULUM ALTERNATIVE FOR THE SEVERELY/PROFOUNDLY HANDICAPPED DEAF- BLIND . . . . . .$ .70

23046 WHAT DIRECTIONS SHOULD RESEARCH TAKE IN DEVELOPING EDUCATIONAL PROGRAMS FOR THE SEVERELY HANDICAPPED - HOFMEISTER. $1.20

23047 INTERACTION PATTERNS OF REGULAR CLASSROOM TEACHERS WITH MILDLY HANDICAPPED STUDENTS IN MAINSTREAMED CLASSROOMS - THOMPSON, MORGAN. . . $ .75

23048 SHARING IN PRESCHOOL CHILDREN: FACILITATION, STIMULUS GENERALIZATION, RESPONSE GENERALIZATION, AND MAINTENANCE - BARTON, ASCIONE. $1.10

23049 CHANGING ON-TASK, OFF-TASK, AND DISRUPTIVE PUPIL BEHAVIOR IN ELEMENTARY MAINSTREAMING CLASSROOMS - BORG, ASCIONE $1.35

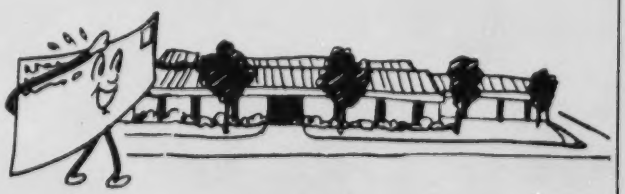
23050 MATERIALS FOR TEACHING SOCIAL SKILLS TO HANDICAPPED CHILDREN: AN ANALYTIC REVIEW - STOWITSCHEK, POWELL. $1.20

23051 BEHAVIORAL INTERVENTIONS FOR CHILDHOOD ELECTIVE MUTISM: AN EVALUATIVE REVIEW - SANOK, ASCIONE. $1.10

23052 IMPLICATIONS OF VIDEO DISC-MICROCOMPUTER INSTRUCTIONAL SYSTEMS FOR SPECIAL EDUCATION - THORKILDSEN, WILLIAMS, BICKEL . . . . . .$ .75

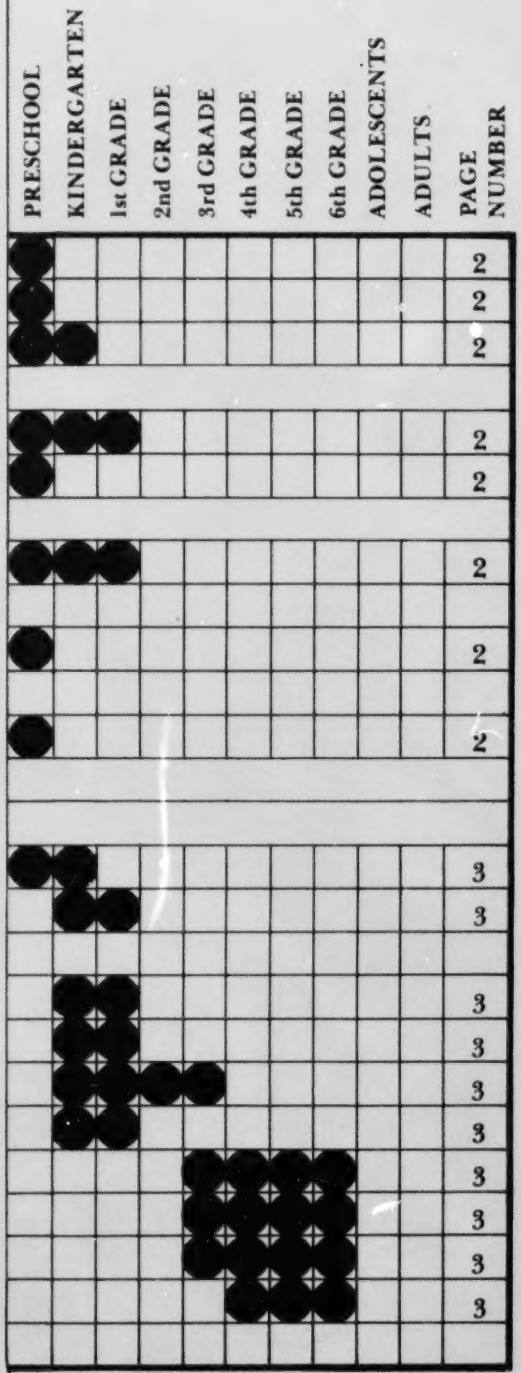
23053 MANUAL COMMUNICATION AS A MEANS OF FACILITATING LANGUAGE WITH THE NONVERBAL HEARING HANDICAPPED - CHAMBERS $1.35

23054 PROMOTING SOCIAL INTERACTION WITH ELDERLY MENTALLY RETARDED PERSONS THROUGH PEER CONFEDERATES - FULLERTON, DY, STOWITSCHEK, STRAIN. $1.20



CROSS REFERENCE

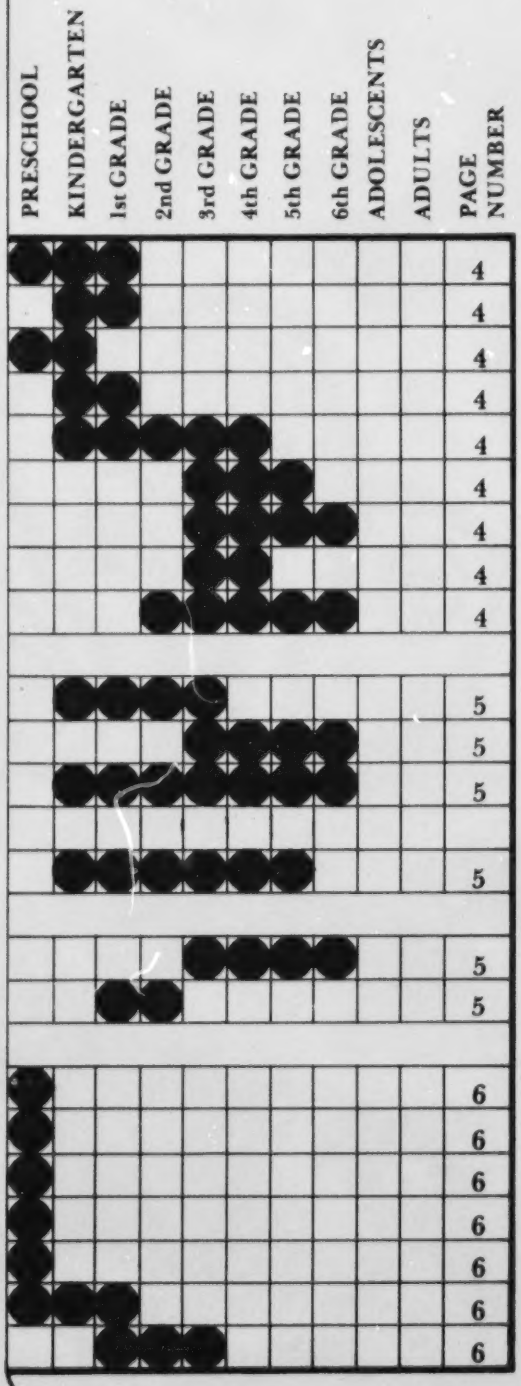
SKILL LEVEL CHART



EARLY DEVELOPMENT PACKAGES	
Motor Development I: Preskill for Sitting	2
Motor Development II: Sitting and Moving About	2
Matching Sizes, Shapes and Colors	2
SPEECH DEVELOPMENT	
Improving Speaking Skills	2
Expressive Language Program	2
LANGUAGE PACKAGES	
Teaching the Retention of Important Oral Phrases and Numbers	2
A Program for Teaching the Understanding of Functional words and Phrases	2
Receptive Language Program	2
ACADEMIC PACKAGES	
READING	
Letter Naming	3
A Program for Teaching the Recognition of Functional Words & Phrases	3
Sound Symbols	3
Blending Sounds	3
Beginning Reading	3
Sound Symbol & Blending	3
Word Recognition	3
Word Endings	3
Vocabulary Building	3
Functional Decoding and Vocabulary Building	3

CROSS REFERENCE

SKILL LEVEL CHART



MATH

Number Skills

Number Skills (E-B Press)

A Program for Teaching the Counting of Objects

Number Symbols

All Math Combinations

Math Combinations (E-B Press)

Carrying & Borrowing

Carrying & Borrowing (E-B Press)

Audio Tutorial Math Program

WRITING

Manuscript Writing

Cursive Writing

Resource Book: Program for the Child With Handwriting Problems

Handwriting

SPELLING

Audio Tutorial Spelling Program

Progammed Spelling

SELF HELP

Independent Dressing Skills

Teaching Zippers, Buttons, Shoes & Socks

Toilet Training I (short term)

Toilet Training II (long term)

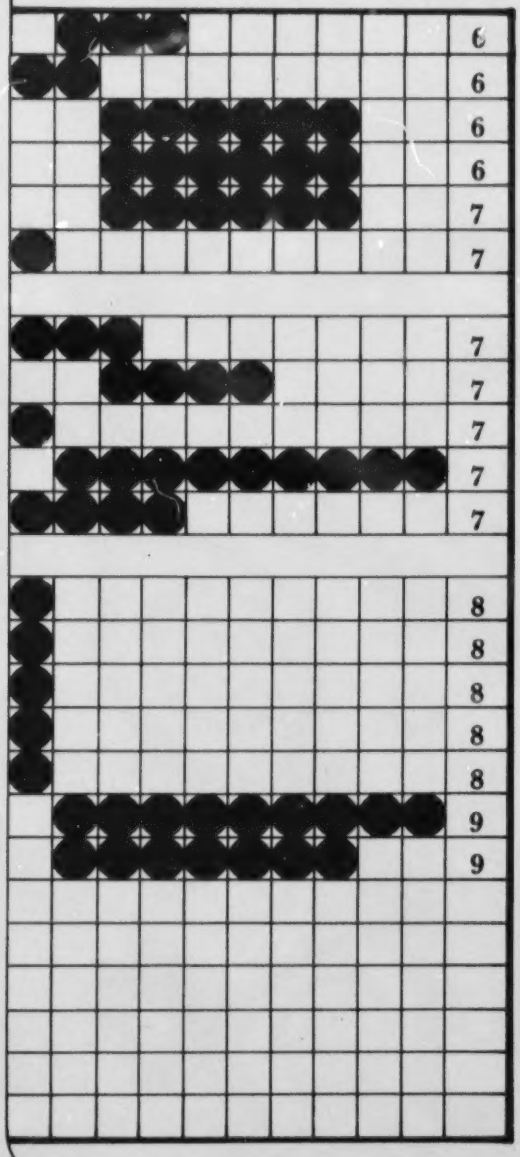
Eating & Drinking

Identification of Coins

Time Telling

CROSS REFERENCE

SKILL LEVEL CHART



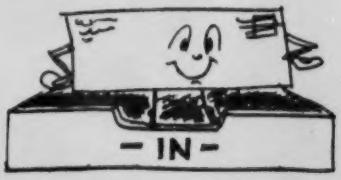
Written Name, Address and Phone Number
Emergency Telephone Skills
Easy Basic Sewing
Seam Stitching
Sewing on Buttons
Self Help - CAMS

SOCIAL/LEISURE SKILLS

Recreation I
Recreation II
Play Skills
Social Skills
SCIPPY

SPECIAL SERIES

Receptive Language - CAMS
Expressive Language - CAMS
Motor Development - CAMS
Self Help - CAMS
Social Emotional - CAMS
PEERS
Sullivan Programmed Reading



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